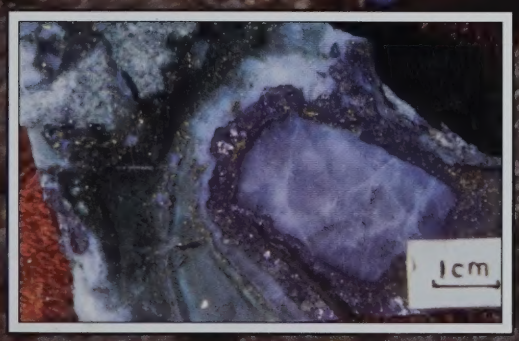
Alaska's Mineral Industry 1994

Division of Geological & Geophysical Surveys
SPECIAL REPORT 49

in cooperation with the
Division of Economic Development
Division of Mining & Water Management



FRONT COVER: *A diamond-drill crew explores the Johnson River gold-polymetallic deposit near Iliamna volcano about 200 miles (320 kilometers) southwest of Anchorage. The deposit, which was discovered by Anaconda Minerals in 1983, contains a current reserve of 1,097,583 tons (997,542 tonnes) grading 10.35 grams per tonnes gold, 7.84 grams per tonnes silver, 8.37% zinc, 1.17% lead, and 0.76% copper. If it is developed, the deposit will be mined by underground mining methods. The deposit is part of lands owned by Cook Inlet Region Inc. and is currently being explored by Westmin Resources Ltd.*

Inset: *Closeup of epigenetic (formed later than the enclosing rocks) textures in the quartz-sulfide stockwork of the Johnson River deposit. (Photos by Chris Rockingham, Westmin Resources Ltd.)*

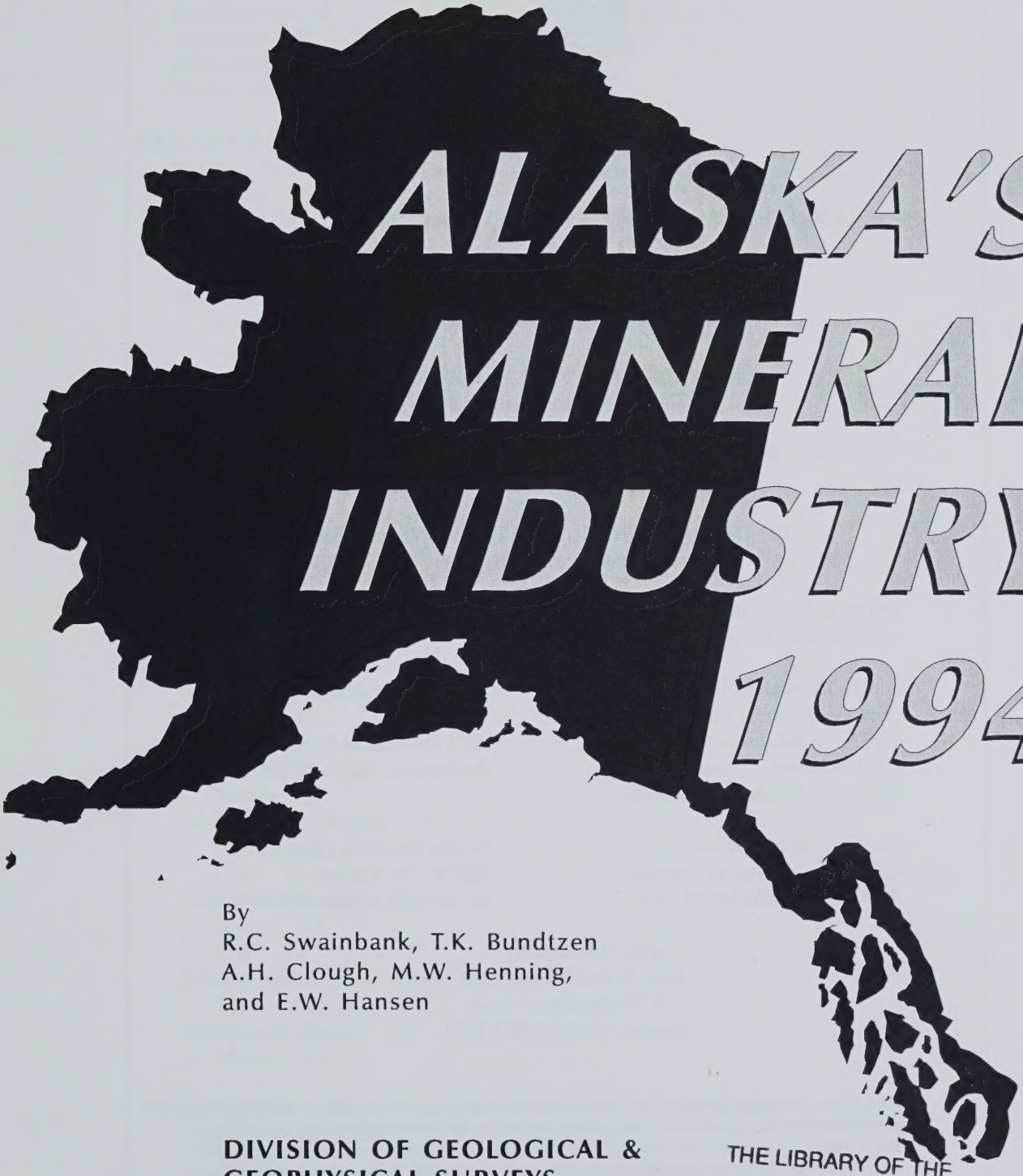
BACK COVER

Top left: *A display of high-purity (about 900 fine) gold nuggets recovered from Silverado Mines Inc. openpit and underground placer gold mine operations on the Eureka and Mary's bench deposits in the Koyukuk-Nolan district of northern Alaska. The center nugget weighs 41.35 ounces (1,286 grams) and is unofficially the tenth largest nugget recovered from Alaska's placer districts. Note: The coin is a 50 cent piece, not a dime. (Photo by Tom Bundtzen)*

Top right: *The Valdez Creek placer gold mine, 50 miles (80 kilometers) east of Cantwell, has been Alaska's largest gold mine for ten of the last eleven years, and it is one of the largest placer gold operations in the world. In 1994 the mine, which has been operated by Cambior Alaska Inc., produced 47,622 ounces (1,481 kilograms) of gold. The photo shows pit A-9, the last of a series of moving pits. The mine is scheduled for closure in September 1995. (Photo by Tom Bundtzen)*

Lower left: *The Red Dog Mine complex in northwest Alaska shows the spatial relationship of the open cast mine (center), the mill and camp facility (foreground), and the tailings pond (left-center). The mine is owned by NANA Corporation and operated by Cominco Alaska Inc. Production of 658,000 tons (596,940 tonnes) zinc, lead, and bulk concentrate made Red Dog one of the world's largest producers of zinc in 1994. (Photo courtesy of Cominco Alaska Inc.)*

Lower right: *Jim Jones, Jim Bennett, and Wayne Dick operate a Diamec diamond drill in the Mystery decline of the Nixon Fork Mine about 34 miles (50 kilometers) northeast of McGrath in western Alaska. Nevada Consolidated Goldfields Inc. is developing the copper-gold deposit as an underground operation with daily capacity of 165 tons (150 tonnes) of high grade ore. Production is scheduled to start in the fall of 1995. (Photo by Richard Flanders)*



ALASKA'S MINERAL INDUSTRY 1994

By
R.C. Swainbank, T.K. Bundtzen
A.H. Clough, M.W. Henning,
and E.W. Hansen

DIVISION OF GEOLOGICAL &
GEOPHYSICAL SURVEYS

SPECIAL REPORT 49

STATE OF ALASKA
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DEPARTMENT OF COMMERCE & ECONOMIC DEVELOPMENT
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DIVISION OF ECONOMIC DEVELOPMENT
Tom Lawson, Acting Director

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Publication of this report is required by Alaska Statute 41 "to determine the potential of Alaska land for production of metals, minerals, fuels, and geothermal resources; the location and supplies of groundwater and construction materials; the potential geologic hazards to buildings, roads, bridges, and other installations and structures; and shall conduct such other surveys and investigations as will advance knowledge of the geology of Alaska."

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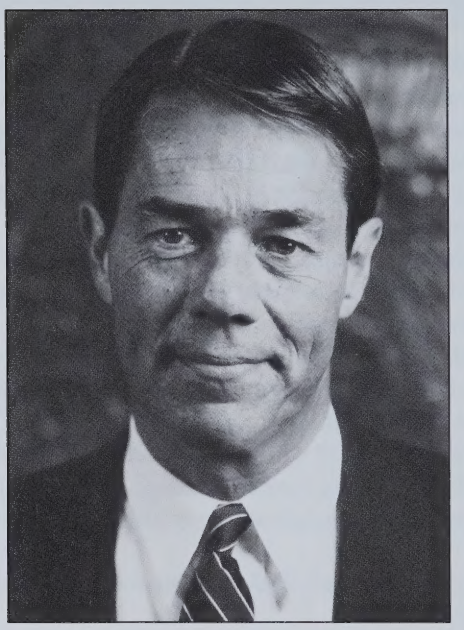


Alaska is open and ready to do business with the mineral industry. Partnerships with this growing segment of our economy are vital to the state's financial stability in the 21st century.

As described in detail in this report, there was an upswing in the value of mineral production in Alaska in 1994. Production increased 13 percent over the previous year, and mineral development increased more than 62 percent.

Development of the Fort Knox Mine near Fairbanks, the Healy Clean Coal Project, Nixon Fork Mine near McGrath, Illinois Creek near Nulato, and the Greens Creek and Kensington mines near Juneau signal a bright future for mineral resources.

State-of-the-art airborne geophysical surveys sponsored by the State in 1993 at Nome, Circle, Nyac, and Valdez Creek resulted in increased exploration activity in 1994. Surveys of the Fairbanks and Richardson mining district in 1994 helped create a claim-staking rush that should result in increased private industry investment.

Recent legislation recognizes mineral exploration as a high-risk venture. It requires stability in land status, and it also requires some incentives. In June 1995, I signed HB 197, a mining incentive bill providing 100 percent credit for exploration costs against future mining license tax, corporate taxes, and royalties on production. This is just one way we are showing the mining industry that Alaska is willing to be a good partner, to share some of the risks and rewards of development in our state.

I look forward to seeing results from this new frontier of private/public partnership with the minerals industry.

Tony Knowles
Governor

FOREWORD

Alaska's Mineral Industry 1994, DGGS Special Report 49, is the 14th in the series of annual mineral reports prepared jointly by the Department of Commerce and Economic Development and the Department of Natural Resources. The primary objective of the report is to provide accurate information about Alaska's mineral industry activity during the calendar year. The information is provided voluntarily by private industry, Native corporations, individuals, and agencies.

The value of mineral production during 1994 was $507.5 million, up 13.1 percent from the $448.7 million in 1993. Mineral development investment increased to $44.94 million in 1994 from $27.7 million in 1993, and exploration expenditures of $31.1 million were slightly higher than in 1993.

During the 1994 calendar year, there were many signs of a rebound of the industry. The Red Dog Mine in northwest Alaska shipped a record amount of polymetallic concentrate. In the last half of the year the mine operated at a profit after extensive improvements in the processing facilities. At the Greens Creek Mine near Juneau, work continued to define a new orebody, and the mine might reopen in late 1996 or early 1997.

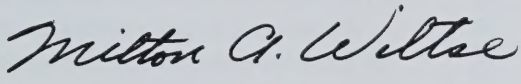
The number of placer gold mines and the amount of gold produced continued to decline, but the value of the gold produced in 1994 was about the same as a result of increased bullion prices. Sand, gravel, and stone production, valued at $68 million, was about the same in 1994 as in the previous year.

Government agencies issued permits for the Fort Knox Mine and for the Healy Clean Coal Project in the eastern interior. Drilling at the True North gold property north of Fairbanks tripled the previous reserve estimates. In southeastern Alaska, the Alaska-Juneau and Kensington Mines have still not received their permits, and the issues of water quality and submarine tailings' disposal continue to be debated. The Nixon Fork Mine near McGrath and the Illinois Creek property near Nulato made progress towards development.

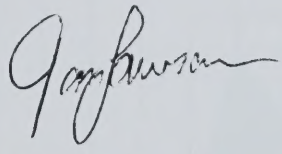
The Usibelli Coal Mine near Healy produced 1.49 million tons (1.35 million tonnes) and shipped about half of that to Korea. At the end of the year Usibelli concluded a new contract with the Korean Electric Power Company and Suneel Shipping Company, which will assure the export of coal for 1995.

The State of Alaska, through the Division of Geological & Geophysical Surveys, contracted for airborne magnetic and electromagnetic surveys of the Fairbanks and Richardson mining districts in 1994. Partly in anticipation of the results, hundreds of new mining claims and prospecting sites were staked in the Fairbanks district during the 1994–95 winter.

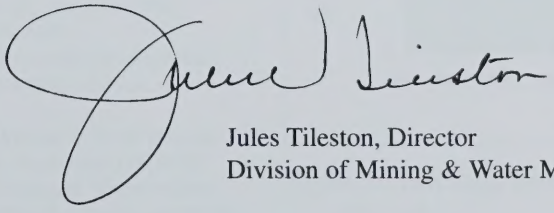
The state presented the first Reclamation of the Year Awards. The state will present annual awards for exemplary work in returning disturbed ground to useful condition as required by state law.



Milton A. Wiltse, Acting State Geologist
Division of Geological & Geophysical Surveys



Tom Lawson, Acting Director
Division of Economic Development



Jules Tileston, Director
Division of Mining & Water Management

Alaska's Mineral Industry 1994

R.C. Swainbank,[1] T.K. Bundtzen,[2] A.H. Clough,[3] M.W. Henning,[4] and E.W. Hansen[5]

EXECUTIVE SUMMARY

This report is a cooperative venture between the Department of Natural Resources and the Department of Commerce and Economic Development. It gives an overview of the minerals industry during the calendar year 1994.

Most of the information contained in the report is provided by the responses to questionnaires mailed by the Division of Geological & Geophysical Surveys to mining companies, Native corporations, consultants, metal recycling companies, and government agencies.

Table 1 shows the expenditures for exploration, development, and the value of production for the last fourteen years. The sum of these phases of mineral activity was $583.5 million in 1994, up 15 percent from the previous year (fig. 1). The value of preproduction mineral investment, or the sum of exploration and development, was $75.24 million, 31 percent greater than in 1993.

Table 1. *Total value of the mineral industry in Alaska by year (in millions of dollars)*

	Exploration	Development	Production	Total
1981	$76.0	$26.4	$188.6	**$291.0**
1982	45.0	41.6	196.4	**283.0**
1983	34.1	27.8	232.4	**294.3**
1984	22.8	53.6	199.4	**275.8**
1985	9.2	34.1	226.6	**269.9**
1986	8.9	24.3	198.5	**231.7**
1987	15.7	100.3	202.4	**318.4**
1988	45.5	275.0	232.2	**552.7**
1989	47.8	134.3	277.0	**459.1**
1990	63.3	14.3	533.0	**610.6**
1991	39.9	25.6	546.5	**612.0**
1992	30.2	30.0	560.8	**621.0**
1993	30.3	27.7	448.7	**506.7**
1994	31.1	44.9	507.5	**583.5**
Total	**$499.8**	**$859.9**	**$4,550.0**	**$5,909.7**

SOURCE: Alaska's mineral industry reports published annually by DGGS.

EMPLOYMENT

In 1994 the mineral industry provided 3,083 full-time-equivalent jobs, down from the 3,136 jobs in 1993, (table 2; fig. 2).

Although there was a decrease in the number of people employed in the placer industry and in polymetallic mines, this decrease was balanced by the increased employment in exploration, development and in the sand and gravel sector. Employment in mineral

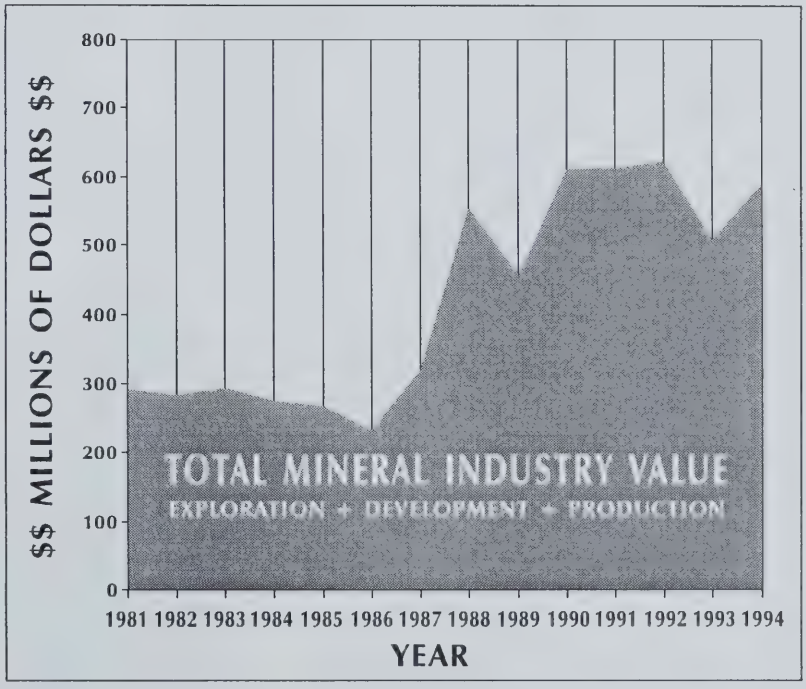


Figure 1. *Total value of Alaska's mineral industry in millions of dollars, 1981–94.*

[1]Alaska Division of Economic Development, 751 Richardson Highway, Suite 205, Fairbanks, AK 99701.
[2]Alaska Division of Geological & Geophysical Surveys, 794 University Ave., Suite 200, Fairbanks, AK 99709-3645.
[3]Alaska Division of Economic Development, 9th Floor, State Office Bldg., Juneau, AK 99811.
[4]Alaska Division of Mining & Water Management, 3601 C Street, Anchorage, AK 99503.
[5]Alaska Division of Mining & Water Management, 3700 Airport Way, Fairbanks, AK 99709.

development is expected to rise in 1995 as the Fort Knox and Nixon Fork hard rock gold mines move toward production, and with the building of the Healy Clean Coal Plant.

EXPLORATION

Exploration expenditures in 1994 were reported as $31.1 million, up slightly from $30.3 million in 1993. Figure 3 shows the regions of the state as described in this report. Although more exploration expenditures were reported in the southeastern region of Alaska in 1994 than in any other area, there were more programs and a higher level of activity in the eastern interior and western regions. Most of the southeast work was underground at the Alaska-Juneau and Greens Creek Mines. Except for the underground work at the Nixon Fork Mine near McGrath, exploration in the rest of the state was carried out from the surface. The Fairbanks area was particularly active. Successful exploration at the True North deposit, the final permitting of the Fort Knox Mine, and anticipation of the release of information from the DGGS airborne geophysical survey that was flown in 1994 prompted the filing of many new claims and prospecting sites.

Activity was reported at the Illinois Creek deposit in western Alaska, at Nolan Creek in northern Alaska, at Vinasale Mountain near McGrath, near Rampart on the Yukon, at the Golden Zone Mine near Cantwell, in the Nome area, and in the Ambler mineral belt.

Several of the major companies that have been active for several years and reported exploration programs throughout the state are Kennecott Exploration, Cominco Alaska Exploration, Amax Gold Exploration, American Copper & Nickel and W.G.M. Newcomers doing exploration in Alaska are Addwest Minerals, Apollo Resources, and USMX. After a brief absence, Placer Dome U.S. and Newmont Mining have returned to Alaska.

After several years of relative quiescence, exploration for coal showed a resurgence in 1994 with the greatest activity in the northwest Alaska coal fields.

DEVELOPMENT

Mineral development expenditures in 1994 were $44.94 million, compared with $27.67 million reported the previous year (table 1).

Major projects were reported at the Red Dog zinc-lead-silver mine, at the Kuchiak coal mine, and at the

Table 2. *Alaska mine employment, 1990–94*[a]

	1990	1991	1992	1993	1994
Gold/silver/mining					
Placer	1,151	1,240	1,251	1,205	1,150
Lode	N/A	N/A	N/A	N/A	--
Polymetallic	265[b]	235[b]	240[b]	26	--
Base metals	350	331	349	376	311
Recreational	315	320	325	270	280
Sand & gravel	645	685	640	580	640
Building stone	160	165	145	205	210
Coal	115	115	115	109	115
Peat	N/A	45	40	49	55
Tin, jade, soap-stone, ceramics, platinum	40	25	20	20	25
Mineral development	95	133	164	132	115
Mineral exploration	374	268	137	164	182
TOTAL	**3,510**	**3,562**	**3,426**	**3,136**	**3,083**

[a]Calculated on a 260-day work year.
[b]Revised estimate based on new company data.
N/A–Not available.

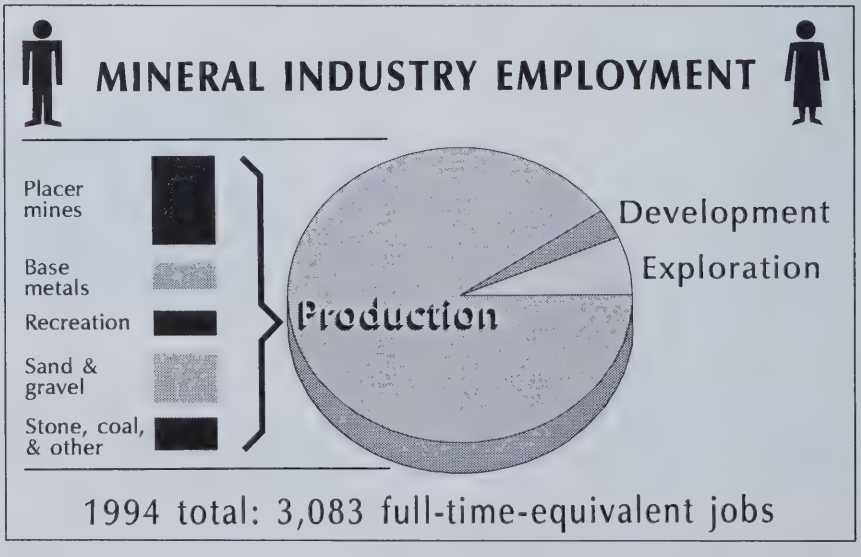


Figure 2. *Mineral industry employment by category, 1994.*

Nolan gold placer mine in the northern region; at the Nixon Fork high-grade gold mine near McGrath, at Illinois Creek, and at Nome in the western region; at the Fort Knox bulk-mineable gold mine and the Eldorado Creek underground placer in the eastern interior region; and at the Kensington and A-J hard-rock gold mines and the Greens Creek underground polymetallic mine in the southeastern region.

We anticipate that the 1995 expenditures will be much greater as the Fort Knox Mine, the Healy Clean Coal Project, the Greens Creek reopening, and several other projects go into high gear.

PRODUCTION

The value of production of all mineral commodities rose from $448.7 million in 1993 to $507.5 million in 1994 (table 1). This is almost entirely the result of increased production at the Red Dog zinc-lead-silver mine near Kotzebue in northwest Alaska.

Although production of gold was less in 1994 than in 1993, rising prices resulted in a slight increase in the value of production. The 26 percent increase in the price of silver in 1994 could not compensate for the production decrease due to the closure of the Greens Creek Mine, so the 1994 value of silver production was $14 million less than in 1993.

The value of zinc production rose from $236 million in 1993 to $296 million in 1994, and the value of lead production increased from $13.7 million to $25.5 million in the same period. All of this production came from the Red Dog Mine, and the owners reported that in the last half of the year the mine showed a profit for the first time.

The amount and value of industrial minerals and coal remained about the same in 1994 as in 1993.

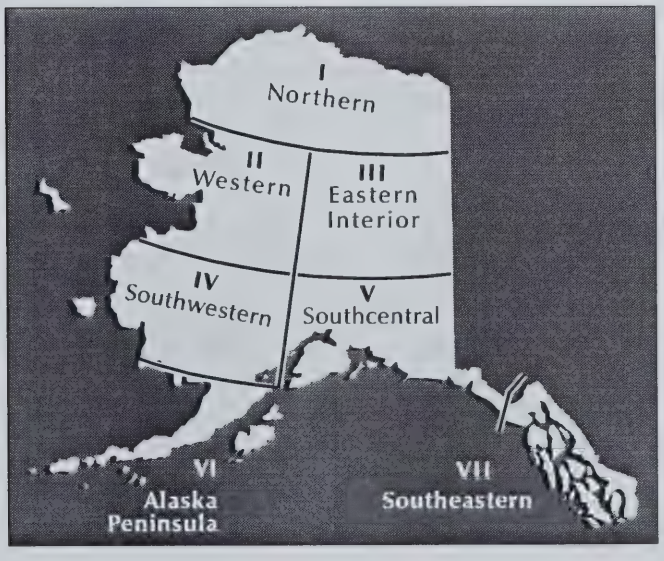


Figure 3. *Regions of mineral activity in Alaska as described in this report.*

GOVERNMENT ACTION

The most significant government actions in 1994 concerned permitting of the Fort Knox deposit and the Healy Clean Coal Project, and an interim solution to the long-standing Mental Health Lands dispute. The State of Alaska also completed the final selections of its Statehood Act land entitlements during 1994.

During 1994 two bills affecting the mining industry were signed into law. One has the effect of extending the terms of permits for the extraction of resources if the holder or issuing agency is prevented from using the permit due to litigation. The second was a technical amendment to the Alaska Lands Act to define the term "state selected land" for the purpose of recognizing mining locations on such lands.

The legislature continued to fund research to document trails which may be asserted as rights-of-way under the Revised Statute 2477 of the 1866 Mining Law, and provided funding to continue airborne geophysical surveys.

The number of federal mining claims was further reduced in Alaska, and only 8,495 federal claims remain active, compared with 20,254 as recently as 1992. The number of active state claims decreased to 22,601 in 1994 from 25,684 in 1993.

ACKNOWLEDGMENTS

This report is designed, produced, and distributed by the Division of Geological & Geophysical Surveys (DGGS) and the Division of Mining & Water Management (DMWM) in the Department of Natural Resources, and The Division of Economic Development (DED) in the Department of Commerce and Economic Development. The current Alaska's Mineral Industry Report is published in the DGGS Special Report series, and is available from the three participating agencies.

In November 1994 Tom Bundtzen and Joni Robinson of DGGS mailed approximately 950 questionnaires to mineral exploration companies, Native corporations, mine operators, and government agencies that oversee or regulate mining activity. A total of 196 questionnaires was completed and returned to DGGS. We sincerely thank all of the respondents, without whom this report would not be possible.

Dick Swainbank wrote the Introduction, Exploration, Development, Drilling, and Government Action sections with the help of Al Clough and the other authors, and updated Appendix D. Tom Bundtzen wrote the Production and Metal Recycling sections, co-authored the Executive Summary, and updated Appendixes F and G. Erik Hansen updated Appendixes A and B, and Joni Robinson updated Appendix C. Mitch Henning and Tom Bundtzen contributed the special report on the interim Mental Health Land Settlement that was ratified by the courts and legislature.

The production team consisted of Ann-Lillian Schell for the cover design, Greg Laird for the computer graphics, Fran Tannian for editing, and Joni Robinson for publication design and desktop publishing.

EXPLORATION

The reported amount spent on exploration in 1994 was $31.1 million, a modest increase over the $30.3 million reported in 1993. This figure is based on the responses by 74 companies that were received by May 1995 to questionnaires mailed by the State Division of Geological & Geophysical Surveys. Figure 4 illustrates 1994 exploration expenditures by commodity. Figure 5 shows the locations of selected exploration programs throughout the state in 1994.

Table 3 compares the 1994 expenditures with those of previous years, and table 4 shows the expenditures by region and deposit type. Table 5 shows the number of claims staked and active throughout the state. The number of federal claims decreased about 60 percent between 1992 and 1994 which may reflect the new federal claim rental fee instituted in late 1992. The rental fee for many state mining claims doubled in 1994 from $20 per 40-acre (16-hectare) claim to $40 per claim, which might explain the decrease in the number of active state claims between 1993 and 1994.

NORTHERN REGION

Reported exploration expenditures in the northern region in 1994 were $4.04 million, more than double the $1.52 million reported the previous year.

Metals

The Ambler mineral belt was a site of renewed interest in 1994. This area on the south slope of the west-central Brooks Range contains the Bornite, Arctic, Sun, Smucker, Omar, and Frost volcanogenic massive sulfide deposits. Teck Exploration Company was the most active, and staked 160 mining claims. Kennecott Exploration, NANA Regional Corporation, and Cominco Alaska Exploration also had exploration crews in the Brooks Range.

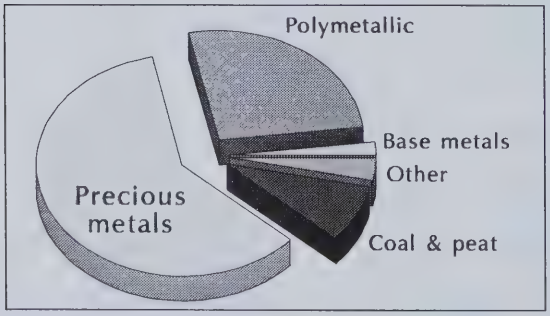


Figure 4. *Exploration expenditures by commodity, 1994.*

Further east, on Nolan Creek near Wiseman, Silverado Mines (U.S.) Inc. continued placer exploration and reported that gold had been found associated with antimony mineralization along a 3-mile (5-kilometer) trend on the property. Some of the gold recovered from the placer mining was very fragile and enclosed within quartzite wall rock, indicating minimal transport. Silverado plans to further explore this mineralized zone in 1995. Lloyd Swenson performed minor exploration at his placer mine on Slate Creek near Wiseman.

In the fall, in the vicinity of Chandalar Lake, Hamlyn Estates staked a large block of hardrock claims. Del Ackels of Gold Dust Mines churn drilled on Big Creek during the summer.

Coal

Much of the coal exploration in the Northern Region was at the Kuchiak Coal Mine, 120 miles (193 kilometers) north of Kotzebue. Arctic Slope Consulting Group, working with Hobbs Industries and the U.S. Bureau of Mines, started development of a demonstration underground mine. This small underground mine, accessed through two portals, is about 1 mile (1.6 kilometers) from the site of a proposed large-scale mine. One entry is supported with conventional roof bolts and the other with resin-anchored bolts. A continuous miner was used to extract the coal. Many of the expected problems due to mining in permafrost—such as frozen water lines and goggles—were dealt with successfully.

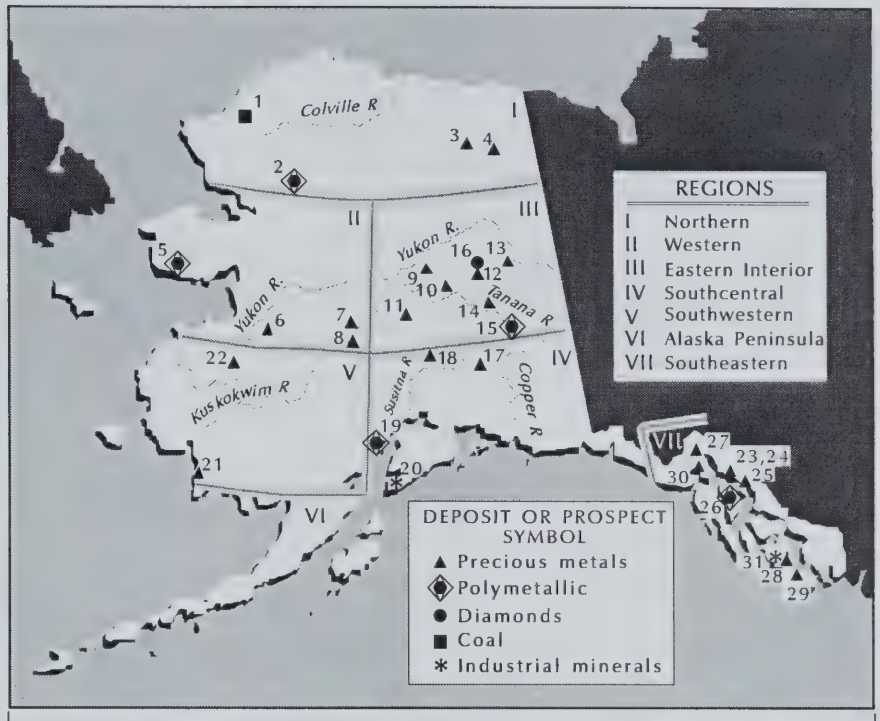
Under a $600,000 matching grant administered by the U.S. Bureau of Mines, a number of other studies were undertaken relating to reclamation of a nearby site, social and environmental impacts, hydrology and blasting methods. A contract has been let to Canarctic Shipping Company Ltd. to assess the feasibility of shipping coal from the northwest arctic to market. This company has accumulated extensive experience shipping to and from mines in the Canadian high arctic, much further north than Barrow.

WESTERN REGION

Over $6.5 million was spent on exploration in the western region in 1994, almost double the $3.4 million of the previous year. Most of the activity was for hard-rock gold, but polymetallic targets were sought in the Nome area. In February 1994 the results were released of the 1993 magnetic and electromagnetic surveys of about 400 square miles (1,036 square kilometers) around Nome as well as the preliminary geologic and geochemical maps. These maps apparently helped the exploration efforts of the companies in the area, particularly in the low-lying areas within the broad river valleys.

Metals

Kennecott Exploration has been working for several years on land owned by the Sitnasuak and Bering Straits Native Corporations, mainly in the vicinity of Rock Creek and Aurora Creek northwest of Nome. In 1994 an exploration agreement was signed by Kennecott, the Sitnasuak Corporation, and the Bering Straits Native Corporation to evaluate corporation lands. This agreement will result in annual exploration expenditures of about $2 million over the next three years. During the year the company drilled 5,600 feet (1,707 meters) of core and 18,000 feet (5,486 meters) of reverse-circulation hole, as well as numerous shallow auger holes. Several members of the exploration crew are local Native residents. Kennecott also had a significant exploration program near Candle in the northern part of the Seward Peninsula.



I Northern Region
1. Kuchiak Mine—Arctic Slope Consulting Group
2. Ambler Mineral Belt—Kennecott Exploration, Teck Exploration, Cominco Alaska, NANA Regional Corp.
3. Wiseman Area—Silverado Mines (U.S.) Inc.
4. Chandalar Lake—Hamlyn Estates

II Western Region
5. Nome Area—Kennecott Exploration, Cominco Alaska
6. Illinois Creek—USMX Inc.
7. Nixon Fork—Consolidated Nevada Goldfields
8. Vinasale Mountain—ASA Inc.

III Eastern Interior Region
9. Sawtooth Mountain—ASA/ Montague J-V.
10. Fairbanks district
    a. True North—LaTeko Resources Ltd.
    b. Fort Knox—Fairbanks Gold Mining Inc.
    c. Ester Dome—Silverado Mines (U.S.) Inc.
    d. General—Amax Gold Exploration, Placer Dome (U.S.) Inc.
11. Liberty Bell—Noranda Exploration
12. Stoneboy Creek—WGM Sumitomo
13. Circle district—Amax Gold Exploration
14. Richardson district—Tri-Valley Corp.
15. Tok area—American Copper and Nickel Co.
16. Clums Fork—Apollo Resources Inc.

IV Southcentral Region
17. Zackley—Noranda Exploration
18. Golden Zone—Addwest Minerals Inc.
19. Johnson River—Westmin Resources Ltd.
20. Red Mountain—Addwest Minerals Inc.

V Southwestern Region
21. Goodnews Bay—Starcore Resources Ltd.
22. Stuyahok—Calista Corp.

VI Alaska Peninsula Region

VII Southeastern Region
23. Kensington—Couer Alaska Inc./ Echo Bay Alaska Inc.
24. Jualin—Couer Alaska Inc.
25. Alaska-Juneau—Echo Bay Alaska Inc.
26. Greens Creek—Kennecott Greens Creek Mining Co.
27. Haines—Kennecott Exploration Inc.
28. Hetta Inlet—American Copper and Nickel Co.
29. Dolomi—Sealaska Corp.
30. Dream—Henkins/Eichman
31. Calder Bay—Sealaska

Figure 5. *Selected exploration projects in Alaska, 1994.*

Cominco Alaska Exploration was also active north of Nome, working on its own claims and several thousands of acres of leases. Most of Cominco's 1994 work, including some drilling, was conducted at the Rocky Mountain Creek massive sulfide deposit 20 miles (32 kilometers) northeast of Nome.

On-Line Exploration Services had a crew operating in the Kigluaik area mapping and sampling the high-grade graphite occurrences belonging to N.B. Tweet and Sons. The crew was joined by some of the State Division of Geological & Geophysical Surveys staff who were also operating in the same area.

Table 3. *Reported exploration expenditures in Alaska by commodity, 1982–94*

	Base metals	Polymetallic[a]	Precious metals	Industrial minerals	Coal and peat	Other	Years Total
1982	$31,757,900	N/A	$ 10,944,100	$ --	$ 2,900,000	$ 15,300	**$ 45,617,300**
1983	9,758,760	N/A	20,897,555	2,068,300	1,338,454	70,000	**34,133,069**
1984	4,720,596	N/A	14,948,554	270,000	2,065,000	279,500	**22,283,650**
1985	2,397,600	N/A	6,482,400	--	270,000	--	**9,150,000**
1986	1,847,660	N/A	6,107,084	170,000	790,000	--	**8,914,744**
1987	2,523,350	N/A	11,743,711	286,000	1,150,000	31,000	**15,734,061**
1988	1,208,000	N/A	41,370,600	160,200	2,730,000	--	**45,468,800**
1989	3,503,000	N/A	43,205,300	125,000	924,296	5,000	**47,762,596**
1990	5,282,200	N/A	57,185,394	370,000	321,000	97,000	**63,255,594**
1991	4,789,500	N/A	34,422,039	92,000	603,000	2,000	**39,908,539**
1992	1,116,000	3,560,000	25,083,000	25,000	425,000	--	**30,209,000**
1993	910,000	5,676,743	23,382,246	163,500	--	125,000	**30,257,489**
1994	600,000	8,099,054	18,815,560	225,000	2,554,000	810,000	**31,103,614**
TOTAL	**$70,414,566**	**$17,335,797**	**$314,587,543**	**$3,955,000**	**$16,070,750**	**$1,434,800**	**$423,798,456**

[a] Polymetallic deposits considered as a separate category for the first time in 1992.
N/A–Not available.
-- Not reported.

Table 4. *Reported exploration expenditures and employment in Alaska by commodity and region, 1994*

	Northern	Western	Eastern interior	South-central	South-western	Alaska Peninsula	South-eastern	Total
Exploration expenditures								
Base metals	--	--	--	100,000	--	--	500,000	**600,000**
Polymetallic[a]	320,000	1,014,000	2,615,054	340,000	200,000	--	3,610,000	**8,099,054**
Precious metals								
Placer	1,010,000	119,000	318,160	151,000	98,000	--	3,400	**1,699,560**
Lode	150,000	5,400,000	4,371,000	950,000	450,000	--	5,795,000	**17,116,000**
Coal and peat	2,554,000	--	--	--	--	--	--	**2,554,000**
Industrial minerals	--	--	50,000	30,000	--	--	145,000	**225,000**
Other	10,000	--	800,000	--	--	--	--	**810,000**
Total	**4,044,000**	**6,533,000**	**8,154,214**	**1,571,000**	**748,000**	--	**10,053,400**	**31,103,614**
Exploration employment								
Employment								
Workdays	4,788	10,149	11,478	1,626	1,128	--	18,020	47,189
Workyears[b]	18	39	44	6	4	--	69	182[c]
Number of companies reporting[d]	10	11	30	10	5	--	8	74

-- No expenditures reported
[a] Jade, platinum, gemstones.
[b] Based on 260-day workyear.
[c] Small discrepancy on total due to rounding
[d] Same companies active in more than one area.

Kenneth Hughes reported exploring for placer gold in the same area, and Lost River Mining worked in the Tripple Creek area east of Nome evaluating gold placer potential. Steve Pomrenke reported a trenching and sampling program seeking gold in the Nome area.

On-Line Exploration Services evaluated the Win tin-silver prospect about 20 miles (32 kilometers) north of McGrath, where the U.S. Bureau of Mines investigated the potential in 1990-91. At the Won prospect, approximately 20 miles (32 kilometers) northeast of the Win prospect, the bureau estimated a minimum resource of 25.3 million pounds (11.54 million kilograms) of tin. These are two of several prospects in the northern part of the Kuskokwim Mountains between McGrath and Manley that contain tin, silver, bismuth, antimony, and tellurium as complex sulphosalts.

Table 5. *Summary of claim activity, 1989–94*

Year	1989	1990	1991	1992	1993	1994
New claims						
State	3,928	2,573	3,391	2,606	2,042	3,365
Federal	1,562	1,888	1,299	695	601	341
Subtotal	**5,490**	**4,461**	**4,690**	**3,301**	**2,643**	**3,706**
Active claim assessment						
State	N/A	32,275	29,754	26,615	25,684	22,601
Federal	N/A	25,792	23,222	20,254	9,298	8,495
Subtotal	**64,225**	**58,067**	**52,976**	**46,869**	**34,982**	**31,096**
Total state	N/A	34,848	33,145	29,221	27,726	25,966
Total federal	N/A	27,680	24,521	20,949	9,899	8,836
TOTAL	**69,715**	**62,528**	**57,666**	**50,170**	**37,625**	**34,802**

N/A–Not available.

Consolidated Nevada Goldfields Corporation (CNGC) had another busy year in 1994 at the Nixon Fork property, northwest of McGrath. The company drove two 11-by-10-foot (3.3-by-3-meter) declines, and from these declines cut several access drifts to explore mineralized zones in the Crystal–Garnet and the Mystery orebodies. The company also completed drifts on four other orebodies: Garnet Deep, Garnet Low, Old Crystal, and M-700. A total of 3,000 feet (914 meters) of underground development was completed during the year.

In addition to the underground work, a total of 25,000 feet (7,620 meters) of surface and underground drilling expanded total mineable reserves to 122,549 tons at 1.33 ounces per ton of gold, which is 163,030 contained ounces (111,250 tonnes at 45.63 grams per tonne with 5,071 kilograms of contained gold) with possible reserves of 39,160 tons grading 0.96 ounces per ton, or 37,600 contained ounces (35,550 tonnes at 32.94 grams per tonne and 1,170 kilograms of contained gold). These reserves are contained within previously discovered orebodies, but the drilling also identified six new areas of mineralization, called the Recreation, High Grade, J-5A, and Southern Cross, all of which are open ended (fig. 6).

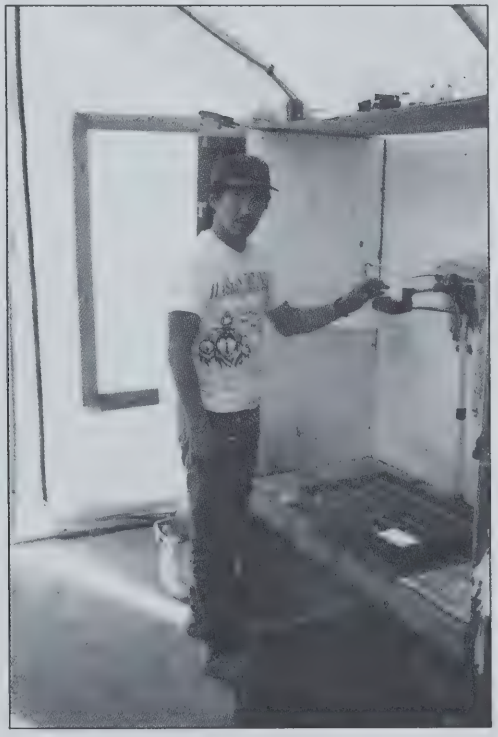


Figure 6. *Nixon Fork Mining Company employee Arnold Andrews from McGrath photographs diamond-drill core from the Nixon Fork gold-copper deposit about 35 miles (56 kilometers) northeast of McGrath. (Photo by Richard Flanders)*

CNGC will begin construction of the mine plant in 1995 and initiate full-scale mining by the fourth quarter of 1995 at a rate of 60,000 ounces (1,866 kilograms) per year with a cash-cost of $169 per ounce ($5.44 per gram).

At Vinasale Mountain, south of McGrath, ASA Inc. drilled 17,265 feet (5,262 meters) of core, mainly as infill of the previous drilling on the Central Zone orebody. This drilling also intersected a new deeper body of gold mineralization. The veins are steeper than originally estimated, and the deposit is open at depth. Within the Central Zone the gold is associated with disseminated pyrite, arsenopyrite, and stibnite, with minor boulangerite, sphalerite, and galena. Higher grades are associated with several bodies of monzonite intrusion breccia and hydrothermal breccia with pervasive quartz-dolomite-sericite alteration within the 69 million year-old monzonite stock. In the nearby Northeast Zone the mineralization of pyrite, arsenopyrite, and stibnite is hosted within narrow quartz-dolomite veinlets that are localized by an expansive set of northeast-trending fractures. The ore at Vinasale is refractory, but 98 percent reports to a flotation concentrate, and ASA has contracted with Signet Technologies to review the amenability options. The current resources in the Central Zone at Vinasale Mountain are 11.3 million tons (10.3 million tonnes) grading 0.070 ounces gold per ton (2.4 grams per tonne) for a total of 789,000 ounces (24,540 kilograms) of gold.

ASA also conducted regional exploration in the northern Kuskokwim Mountains.

Illinois Creek is another advanced exploration property in western Alaska. In the late summer of 1994, USMX Inc. of Lakewood, Colorado, agreed to purchase the rights to mine the deposit from North Pacific Mining Co. (NPMC), a subsidiary of Cook Inlet Region Inc. Early in 1995 NPMC signed the agreement that allows NPMC the right to a 25 percent working interest that is convertible to a 5 percent net smelter return. The property is entirely on lands owned and managed by the State of Alaska. The 1994 exploration program included 8,108 feet (2,467 meters) of diamond drilling and confirmed the 3.9 million tons (3.53 million tonnes) mineable reserve grading 0.088 ounces per ton (3.02 grams per tonne) of gold and 1.7 ounces per ton (58.2 grams per tonne) of silver. USMX began the permitting process in late 1994 with a view to moving in equipment in late 1995 and beginning the mining in 1996.

EASTERN INTERIOR REGION

Reported exploration expenditures in 1994 were $8.15 million, up 16 percent from the $7.05 million reported in 1993. Most of the investment was in hardrock gold and polymetallic exploration. At the request of the Fairbanks Industrial Development Corporation, the state contracted for airborne geophysical surveys of 600 square miles (1,554 square kilometers) in the Fairbanks mining district and 130 square miles (337 square kilometers) in the Richardson district about 60 miles (97 kilometers) southeast of Fairbanks. The aeromagnetic and electromagnetic data acquisition cost about $361,000, or about $487 per square mile ($188 per square kilometer) with flight lines one-quarter-mile (0.4-kilometer) apart. Staking of large blocks of mining claims and prospecting sites began in late fall and continued through the winter partly in anticipation of the results of the airborne surveys, which became available in February, 1995. The University of Alaska also contracted for an airborne survey of about 20 square miles (32 square kilometers) of University-owned land just to the east of the Fairbanks survey.

Metals

As in past years, most of the exploration activity in 1994 has been in the Fairbanks area and the surrounding hills. La Teko Resources Ltd., which is managed through Ryan Lode Mines Inc., continued with baseline studies and geotechnical work at its Ryan Lode Mine on Ester Dome west of Fairbanks. Silverado Mines (U.S.) Inc. had a reverse-circulation drilling program on Ester Dome testing some of the targets developed by American Copper and Nickel Co. during its lease of the past few years.

La Teko also conducted a major exploration program at its True North property west of Pedro Dome drilling 2,042 feet (622 meters) of core, and 52,085 feet (15,875 meters) of reverse-circulation hole (fig. 7). Proven and probable reserves at True North as certified by Mine Development Associates of Reno are 446,000 ounces (13,872 kilograms) of gold, with an average grade of 0.065 ounces per ton (2.72 grams per tonne) of gold, and with a 2.14:1 stripping ratio.

This reserve is contained in two discrete orebodies, the Hindenburg and the Shepard, which are aligned along northeast-trending structures. La Teko expects further exploration to determine continuity. Mine Development Associates has also identified inferred reserves of 6,000,000 tons (5,447,000 tonnes) grading 0.034 ounces per ton (1.16 gram per tonne) of gold in the area of the two deposits.

True North is probably the most promising new gold discovery made in the eastern interior since the discovery of the Fort Knox Deposit in the mid-1980s. The deposit is important because until quite recently the terrane in which it occurs was not thought to be prospective for bulk-tonnage mines, although the narrow high-grade stibnite veins at the Hindenburg Mine have been known since the earliest days of the mining camp. The gold is associated with quartz-siderite veins and veinlets emplaced in a black carbonaceous quartzite

unit, which is itself part of a sequence containing stratiform calcareous eclogites. At the end of the season a wildcat hole drilled 1,500 feet (457 meters) from the nearest drill hole on the True North property intercepted a mineralized dike of altered porphyritic igneous rock, which could be indicative of a source of the gold mineralization.

La Teko also announced that it could earn up to 60 percent interest in International Freegold Mineral Development's Golden Summit property, which contains several of the most important historic hard-rock mines of the Fairbanks district within the 11-mile (18-kilometer) strike-length of the property. From west to east some of the properties are the Newsboy, Cleary Hill, Christina, Nordale, McCarty, and Hi-Yu Mines. Between the McCarty and the Hi-Yu deposits, International Freegold has been exploring a prospect called the Too Much Gold, where trenches within the 10,000-foot-long (3,048-meter) gold-in-soil anomaly have yielded intercepts up to 110 feet (34 meters) of 0.060 ounces of gold per ton (2.06 grams per tonne) and 655 feet (200 meters) of 0.022 ounces of gold per ton (0.75 grams per tonne).

Previous drilling included 70 feet (21 meters) of 0.090 ounces of gold per ton (3.09 grams per tonne) and 25 feet (7.6 meters) of 0.16 ounces of gold per ton (5.5 grams per tonne). Avalon Development Co. spent part of the season doing geochemical and geophysical surveys within the Golden Summit block, and late in the year began to acquire ground for Placer Dome U.S. Inc. Several deep drill holes were completed on behalf of Placer Dome.

Following a press release about the results of the True North 1994 exploration, Placer Dome U.S. Inc. began a land acquisition program which continued into the winter in the eclogite-bearing terrane hosting the True North property. Fairbanks Gold Mining Inc., a subsidiary of Cyprus-Amax, and owner of the Fort Knox Mine, also began consolidating its land position during the fall of 1994. During the summer the company had a modest drilling program to test targets east of the minesite and continued evaluation of the Gil claims leased from Teryl Resources Ltd. One hole of the 28-hole program intercepted 90 feet (27 meters) averaging 0.067 ounces per ton (2.3 grams per tonne) of gold.

By midsummer Fairbanks Gold Mining Inc. received its final permit from the U.S. Army Corps of Engineers, which allowed the company to begin earthwork preparatory to mine development.

About 70 miles (112 kilometers) northwest of Fairbanks, near the village of Rampart, ASA Inc. working as ASA/Montague continued to evaluate igneous-hosted gold prospects within a block of land owned by the

Figure 7. *A drill team explores the True North gold deposit about 9 miles (15 kilometers) north of Fairbanks. Work in 1994 proved up approximately 446,000 ounces (13,872 kilograms) of gold in a shallow, synformal ore deposit originally known as the Hindenberg Prospect. More work is planned in 1995. (Photo by Ryan Lode Mines Inc.)*

Doyon Native Corporation. The Huron and Peak 4051 prospects align along a major northeast-trending fault which controls emplacement of a series of gold-related Cretaceous plutons and dikes. Both prospects exhibit intense silicification as flooding and veinlets. Rock samples from the Peak 4051 prospect contain up to 0.20 ounces per ton (6.9 grams per tonne) of gold, and from the Huron prospect up to 0.67 ounces per ton (23.0 grams per tonne) of gold. At the Chapman Creek prospect a swarm of monzonite dikes exhibit intense sericite-dolomite and silica alteration, and contain up to 0.035 ounces per ton (1.2 grams per tonne) of gold. Gold-in-soil anomalies at all these prospects indicate the potential for substantial size, and they may be drilled in 1995.

About 80 miles (128 kilometers) east of Fairbanks, WGM Inc., working in a joint-venture with Sumitomo Metal Mining of Canada, had an aggressive exploration program in the headwaters of the Salcha River near Stoneboy Creek.

Modest exploration continued in the Richardson mining district 50 miles (80 kilometers) southeast of Fairbanks. Tri-Valley Corporation, the major claimholder in the area, collected bulk samples from the Democrat Mine, and re-analyzed portions of the drill-core collected in 1988. Late in the year the company announced that metallic-screen–fire assay of a 10-foot (3-meter) section of core from the surface, and a 5-foot (1.5-meter) section from a depth of 225 feet (69 meters) assayed at 3.4 ounces of gold per ton (116.6 grams per tonne) rather than at the low values reported previously. Tri-Valley intends to pursue confirmation drilling in 1995.

The state-sponsored airborne geophysical survey flown in 1994 of the Richardson district should be of great assistance in this area of heavy vegetation and silt cover.

At the Liberty Bell Mine near Healy, 100 miles (160 kilometers) southwest of Fairbanks, Noranda Exploration Inc. acting as agent for Hemlo Gold Mines Inc., trenched several anomalies that were discovered through geochemistry and geophysics. The property was under lease from Liberty Bell Mining Company.

American Copper and Nickel Company (ACNC) had a major exploration program in the Delta district near Tok. The program worked a joint-venture on and around several polymetallic prospects owned by Pacific Northwest Resources Inc.

Cyprus-Amax Gold Co. based a crew in Circle for most of the summer to prospect for gold. The company was also active in the Fairbanks district. BS Mining also dug test-pits in the Circle area. Teck Exploration, Cominco Alaska Exploration, and Kennecott Exploration also fielded exploration crews at undisclosed locations in the interior. ASARCO examined some property but did no regional exploration. Grateful Dog Mining continued exploration with trenching on Hattie Creek.

A number of the placer miners in interior Alaska reported some exploration activity. In the Fairbanks district, Alder Creek Mines did some bulk sampling on the right limit of Fairbanks Creek, and David Johnson of Coromandel Mining Co. drilled the TAT claims in Bear Creek south of Fairbanks Creek. Herning Exploration and Mining completed minor exploration at Palmer Creek on the Upper Chena River, and Ted Leonard and Carl Redfern worked on the Salcha River.

Twogood Construction tested methods for suction dredging in deep water on Goldstream Creek and plans to continue with a larger test-program in 1995.

In the Manley-Eureka area Arnold Mason spent a few days prospecting, and Donval Simpson spent a month test sluicing.

The Circle area was a little more active than last year, with five companies and groups reporting placer exploration programs. BHD Mining cut 19 exploration trenches on the North Fork of the Twelvemile River working with DOXAUCO Enterprises Inc., and Colledge Enterprises reported exploration on Bottom Dollar Creek. Paul and Company did some reverse-circulation drilling on Porcupine Creek but plan to move to Fryingpan Creek. Bob Cacy of Points North was active on both Portage and Crooked Creeks. David Underwood tested ground in several Circle district creeks during 1994.

Elsewhere in the interior, Fred Cook prospected in the Portage Creek drainage north of Mt. Hayes, D'Log Industries Inc. drilled and sampled on No-Name Creek in the Bonnifield district, and Glacier Six Enterprises reported trenching in Broxson Gulch in the Mt. Hayes area.

Industrial Minerals

The only reported exploration for industrial minerals was by Lakloey Inc. with Stevens Exploration in the Tenderfoot area of the Richardson district. The work consisted of trenching and mapping for riprap and rock.

Diamond Exploration

Apollo Resources Inc., on behalf of Verdstone Gold Co., explored for diamonds in the Clums Fork-Far Mountain area, about 70 miles (112 kilometers) east-northeast of Fairbanks. Apollo drilled about 3,000 feet (914 meters) of 5.5-inch (14 centimeter) reverse-circulation holes to secure about 24 tons (21.8 tonnes) of cuttings, sampled in intervals of 2.5 feet (0.76 meters). The samples were transported to Fairbanks where they were comminuted in a small ball mill and then passed over a grease table to collect any diamonds present.

Apollo also collected about 2 cubic yards (1.5 cubic meters) of gravel at eight sites for heavy-mineral concentrate studies. These samples were shoveled through a small jig plant before being flown to Fairbanks for heavy-mineral separation.

SOUTHCENTRAL REGION

In 1994 exploration investment in the southcentral region was $1.57 million, about the same as the $1.54 million reported in 1993. Highlights include renewed activity at the Golden Zone Mine in the Upper Chulitna mining district, at Johnson River on the west side of Cook Inlet, and at Red Mountain south of Seldovia.

Metals

Addwest Minerals Inc. used diamond and reverse circulation drilling to evaluate the Golden Zone Mine in the Upper Chulitna mining district near Cantwell (fig. 8). This former producing gold-copper mine is hosted in a Late Cretaceous intrusive breccia pipe. Recent exploration has identified the host rocks of the pipe as a shoshonitic composite intrusive body consisting of small plugs of biotite quartz diorite, and plugs and dikes of mafite. Mafite is a silica-carbonate rock formed by the pervasive alteration of dikes of intermediate to mafic composition. These mafite dikes cut the quartz diorite and the sheeted vein zones that flank the main breccia pipe.

Westmin Resources Ltd. continued mapping and sampling at the Johnson River polymetallic property near Iliamna Volcano. The property is managed by North Pacific Mining Co., for owner Cook Inlet Region Inc., an Alaska native regional corporation. This deposit is hosted in volcanic and volcaniclastic rocks of the Jurassic Talkeetna Formation. Drilled reserves at a $50 per ton ($45 per tonne) cutoff are 1.1 million tons (997,542 tonnes) at 8.37 percent zinc, 1.17 percent lead, 0.76 percent copper, 0.302 ounces per ton (10.35 grams per tonne) of gold, and 0.23 ounces per ton (7.84 gram per tonne) silver. The 1994 work, including metallurgical testing of the ore, will lead to a prefeasibility report.

East of Valdez Creek in the Alaska Range, Noranda Exploration had a small drilling program on behalf of Hemlo Gold at the Zackley copper- and gold-bearing skarn-marble prospect. The prospect is owned by Pacific Northwest Resource Company. Previously reported reserve estimates are 1.4 million tons (1.27 million tonnes) grading 2.6 percent copper and 0.175 ounces per ton (6.0 grams per tonne) of gold.

An American Copper and Nickel Co. crew prospected for copper and zinc at undisclosed locations in the southcentral area.

Several gold placer exploration programs were reported in the southcentral area in 1994. Empire Exploration was active in the Yentna area, and Ed Ellis prospected on Independence Creek and on Lake Creek. Tim Geirrmann prospected at Paxson, Petersville, Hope, and Hatcher Pass. Halloran Operation sampled the Kahiltna River. Howard Hunt reported exploration in the Silver Creek area near Iliamna and on Big Boulder Creek at Collinsville.

Industrial Minerals

North Pacific Mining Co. worked with Addwest Minerals at Red Mountain near Seldovia and examined the possibility of using olivine from the ultramafic intrusive rocks for industrial purposes such as casting media, firebricks, or sandblasting.

SOUTHWESTERN REGION

Exploration expenditures in 1994 were $748,000, down slightly from the $843,000 reported in 1993. There was no exploration for any commodity other than metals.

Metals

Starcore Resources Ltd. worked with Alaska Earth Sciences and the Calista Native Corporation to drill the Goodnews Bay Red Mountain and Susie Mountain areas

Figure 8. *Addwest Mineral Inc. explores the Golden Zone copper-silver-gold deposit in the Chulitna district of southcentral Alaska. The mine produced 1,581 ounces (49 kilograms) of gold, 8,617 ounces (268 kilograms) of silver, and 42,000 pounds (19,051 kilograms) of copper during a brief production period prior to World War II. Reserves at the end of 1993 amounted to 230,000 ounces (7,153 kilograms) of gold and significant copper and silver in about 2.0 million tons (1.8 million tonnes) of ore. During 1994 Addwest Mineral's exploration revealed significant copper-enriched mineralization. (Photo by C.C. Hawley)*

for the source of the placer platinum. Prior to 1976 these placers were the largest source of platinum group elements (PGEs) in the United States.

A Calista Corporation crew drilled and sampled gold placer deposits at Stuyahok in the Holy Cross Quadrangle.

Cominco Alaska Exploration fielded exploration crews in the southwestern district at several undisclosed locations.

Misco-Walsh Mining continued exploration at the Golden Horn property near Flat and continued to resolve metallurgical problems associated with the complex refractory ores on the property.

James Wylie conducted a modest exploration program at the Mountain Top mercury-gold mine in 1994.

Only three placer operations reported exploration activity. Paul Sayer prospected a small amount at the Little Creek Mine. Lyman Resources of Alaska ran an auger-drill program on Queen Gulch near Donlin Creek. Sphinx Natural Resources, in partnership with Malvy Technology Inc., had a substantial gold placer exploration program on Spruce and Trail Creeks in the Ruby-Poorman district.

ALASKA PENINSULA REGION

The only exploration activity reported for the peninsula was a cursory examination of a gold-silver showing in Terror Bay by Koniag Inc., the Native regional corporation.

SOUTHEASTERN REGION

Reported exploration investment in southeast Alaska of $10.1 million was more than in any other region of the state, although it was only 64 percent of the $15.7 million spent in 1993. However, these numbers should be qualified because the large advanced exploration projects at the A-J, Kensington, and Greens Creek Mines shifted towards development between 1993 and 1994. Hence the pre-production investment in the southeastern region, which is the sum of exploration and development expenditures, was $31.1 million in 1994, almost double the $16.3 million invested in 1993.

In addition to large programs at these mine sites, several companies, including American Copper and Nickel, Coeur Alaska, Kennecott Exploration, and Sealaska report substantial regional exploration programs. Except for some industrial mineral exploration by Sealaska, all the rest of the projects were for metals.

Metals

For several years Echo Bay Alaska Inc. has been involved with two major projects near Juneau—the A-J Mine and the Kensington Mine. The A-J Mine is located in Mt. Roberts immediately behind the town of Juneau, and, in fact, the city is built partly on the rock dumps created during the early days of mining at the A-J. Until the mine closed in 1944 it was the economic base. Since then Juneau has grown as the capital city of Alaska and as a tourist destination during the summer months when the state legislature is not in session.

The 1994 exploration program at the A-J Mine consisted of drifting and drilling throughout the mine to expand or confirm existing reserves, which at last report were 105.7 million tons (96 million tonnes) at a grade of 0.05 ounces per ton (1.7 grams per tonne) of gold.

Baseline exploration work, including some diamond-drilling, continued at the Kensington Project about 35 miles (56 kilometers) north of Juneau.

Echo Bay also had a modest exploration program at the Gold Fork prospect on the Gold Fork of Carlson Creek. Gold Fork is a metamorphic vein located in high-grade metamorphic rocks several miles north of the A-J deposit. The prospect has been developed by several short adits and trenches that were dug before 1940. Echo Bay drilled the prospect, staging out of Juneau with helicopter support, rather than from a remote camp. Further work is planned for 1995.

Coeur Alaska now owns the rights to the Jualin Mine a few miles southeast of the Kensington Mine on opposite sides of the mountain. Coeur's exploration program mapped and sampled at the mine and estimated reserves of 1.07 million tons (0.97 million tonnes) with 0.349 ounces per ton (12 grams per tonne) of gold.

The Greens Creek Mine project is a joint-venture between Kennecott and Hecla, with Exalas Resources Corporation as a minority shareholder. Kennecott, the project operator, increased the workforce from 25 to 45 to accelerate work on the newly discovered southwest extension orebody

Kennecott Greens Creek Mining Company completed 4,700 feet (1,433 meters) of drifts to drill 130,000 feet (39,624 meters) of core with holes on 50-foot (15-meter) centers for better definition of the southwest orebody at the Greens Creek Mine. Late in 1994 the reserves of this orebody were reported to be 2.0 million tons (1.81 million tonnes) with grades of 13.5 percent zinc, 5.5 percent lead, 0.27 ounces per ton (9.25 grams per tonne) of gold, and 33 ounces per ton, (1,131 grams per tonne) silver. Approximately 11 million tons (10 million tonnes) of the original orebody remain, with grades of 0.12 ounces per ton (4.1 grams per tonne) of gold, 13.30 ounces per ton (456 grams per tonne) silver, 4.0 percent lead, and 12.8 percent zinc. Total combined reserves and resources for the property were reported as 18 million tons (16.34 million tonnes).

Significantly, some exceptionally high-grade precious-metal zones, especially gold, were discovered during the drilling of the southwest extension mineral

zone. Company geologists estimate that about 5 percent of southwest's orebody will be shipped as ore because of its high grades of precious metals, and the remainder will be shipped as concentrates to various smelters around the world.

Kennecott Exploration also had a regional reconnaissance exploration program in southeast Alaska and completed a moderate diamond-drill program at the Glacier Creek massive-sulfide deposit near Haines.

American Copper and Nickel Co. continued exploration for polymetallic massive-sulfide deposits in the Wales Group rocks near Hetta Inlet of Prince of Wales Island. The 1994 work included mapping, geochemistry and geophysics. Hyak Mining reported claim maintenance of its Red Diamond and East Point polymetallic claims.

Sealaska Corporation, the southeast region's Native corporation, had a very active year, with a drill program for gold at Dolomi on Prince of Wales Island and a substantial reconnaissance exploration program for polymetallic deposits.

Alaska-Dano Mines conducted minor surface mapping and sampling on its patented claims near Funter Bay, west of Juneau. Sporadic base- and precious-metal anomalies have been found in soil and rock samples from a mixed metavolcanic and metasedimentary rock package within the claims.

It is uncertain whether this sequence correlates with similar lithologies at the Greens Creek Mine.

There was limited exploration for placer gold in the Porcupine Creek area near Haines by Snow Lion Mining and by the Foster Operation.

Industrial Minerals

Sealaska reported drilling its high-purity, chemical-grade limestone deposit at Calder Bay on Prince of Wales Island.

DEVELOPMENT

Mineral development expenditures in Alaska in 1994 were $44.94 million, up 62 percent from $27.67 million the previous year (tables 6 and 7). Full-scale mine and infrastructure development at Fort Knox, Nixon Fork, and Healy Clean Coal projects should result in even higher expenditures in 1995.

Figure 9 illustrates the breakdown by commodity of how the industry spent its development dollars. Figure 10 shows the locations of selected development projects throughout the state.

NORTHERN REGION

Metals

The reported 1995 development expenditures in the northern region were $12.6 million, up 15 percent from the $10.96 million reported in 1993. Most of this work was at Cominco Alaska's Red Dog Mine, where modifications to the grinding and milling circuits continued from the previous year. This substantial upgrade enabled Cominco to increase production in 1994 and to achieve a cleaner zinc concentrate.

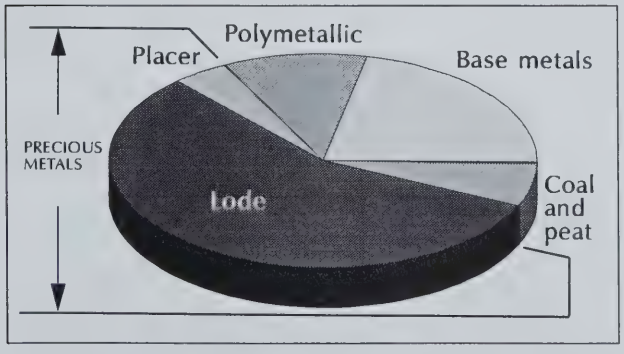


Figure 9. *Development expenditures by commodity, 1994.*

Silverado Mines (U.S.) Inc. had another busy year on Nolan Creek near Wiseman in the eastern Brooks Range where it completed the camp, upgraded the roads, and drove a decline to access underground placer gold reserves on a channel on Marys Bench. The company also stripped ground for opencut mining adjacent to the underground operation. Although the area had the worst flooding in living memory in August, the settling ponds, and the reclamation of the Thompson's Pup minesite came through virtually unscathed (fig. 11). The company was able to spare equipment to assist with levee construction to protect Wiseman from the flood, and received a commendation for its efforts from the people of Wiseman.

In late 1994 Silverado began a 700-foot (212-meter), 15-percent decline to underground reserves in the 3B1 block under the valley of Nolan Creek. The company started preparation of the Ogden/Eureka Bench and the West Block areas for openpit mining in 1995.

Coal

Working with Hobbs Industries and the U.S. Bureau of Mines, Arctic Slope Consulting Group, a subsidiary of the Arctic Slope Regional Corporation, drove two declines at the Kuchiak Mine to demonstrate the viability of coal mining in permafrost. About 4,000 tons

Table 6. *Reported mineral development expenditures in Alaska by commodity, 1982–94*

	Base metals	Polymetallics	Precious metals	Industrial minerals	Coal and peat	TOTAL
1982	$ 10,270,000	N/A	$ 19,320,000	$ 4,251,000	$ 7,750,000	**$ 41,591,000**
1983	19,500,000	N/A	7,112,500	1,000,000	250,000	**27,862,500**
1984	10,710,500	N/A	15,058,555	579,000	27,000,000	**53,348,055**
1985	13,000,000	N/A	16,890,755	1,830,000	2,400,000	**34,120,755**
1986	3,260,800	8,000,000	12,417,172	124,000	530,000	**24,331,972**
1987	38,080,000	48,000,000	13,640,848	188,000	342,000	**100,250,848**
1988	165,500,000	69,000,000	40,445,400	--	--	**274,945,400**
1989	118,200,000	411,000	6,465,350	7,000,000	2,196,000	**134,272,350**
1990	--	4,101,000	7,136,500	30,000	3,079,000	**14,346,500**
1991	--	8,000,000	14,994,350	262,000	2,318,000	**25,574,350**
1992	80,000	4,300,000	23,151,300	404,000	1,655,000	**29,590,300**
1993	--	10,731,136	15,103,000	433,500	1,400,000	**27,667,636**
1994	10,000,000	5,000,000	27,392,850	5,000	2,545,000	**44,942,850**
TOTAL	**$388,601,300**	**$157,543,136**	**$219,128,580**	**$16,106,500**	**$51,465,000**	**$832,844,516**

N/A Figures not available prior to 1986.
-- Not reported.

Table 7. *Reported mineral development expenditures and employment in Alaska, 1994*

	Northern	Western	Eastern interior	South-central	South-western	Alaska Peninsula	South-eastern	Total
Development expenditures								
Base metals	10,000,000	--	--	--	--	--	--	**10,000,000**
Polymetallic	--	--	--	--	--	--	5,000,000	**5,000,000**
Precious metals								
Placer	1,000,000	7,000	690,850	170,000	35,000	--	--	**1,902,850**
Lode	--	3,500,000	5,950,000	--	--	--	16,040,000	**25,490,000**
Coal and peat	1,600,000	--	120,000	825,000	--	--	--	**2,545,000**
Industrial minerals	--	--	5,000	--	--	--	--	**5,000**
Other	--	--	--	--	--	--	--	--
Total	**12,600,000**	**3,507,000**	**6,765,850**	**995,000**	**35,000**	--	**21,040,000**	**44,942,850**
Development employment								
Employment								
Workdays	6,500	3,030	5,539	1,520	50	--	13,370	30,009
Workyears[a]	25	12	21	6	0	--	51	115
Number of companies reporting[b]	2	2	14	5	2	--	4	29

-- Not reported.
[a]Based on 260-day workyear.
[b]Same companies were active in several area.

(3,631 tonnes) of coal were extracted during test mining with a continuous miner (fig. 12). The coal will be used in local villages as an alternate source of heat. Ongoing transportation studies continue to examine the economic feasibility of exporting coal from northwest Alaska to Pacific Rim and other markets.

WESTERN REGION

Reported development expenditures in the western region in 1994 were $3.5 million, more than double the $1.6 million reported in 1993. All development was related to precious metal projects.

METALS

Alaska Gold Co. continued stripping overburden on its reserves near Nome in preparation for the conversion from dredge production to conventional openpit mining. Dredge 6's last year of operation was 1994. Dredge 5 will probably operate in 1995.

Consolidated Nevada Goldfields Inc. drove two 10-by-11-foot (3-by-3.3-meter) declines and cross cuts to provide access to the Crystal and Mystery zones of the gold-copper skarn orebody at the Nixon Fork Mine. Plans call for moving equipment into the area during the winter of 1994–95, building the mine in 1995 and producing gold by the end of the year. The mine is forecast to produce 60,000 ounces (1,866 kilograms) of gold per year for several years (fig. 13).

USMX Inc. began a mine feasibility study for the Illinois Creek gold-silver deposit near Nulato on the Yukon River, and propose to bring in the equipment overland from the river in the winter of 1995–96 or the following year, depending upon the permitting requirements. Plans call for a mining rate of about 34,000 tons (30,845 tonnes) per day to produce about 50,000 ounces (1,555 kilograms) of gold per year.

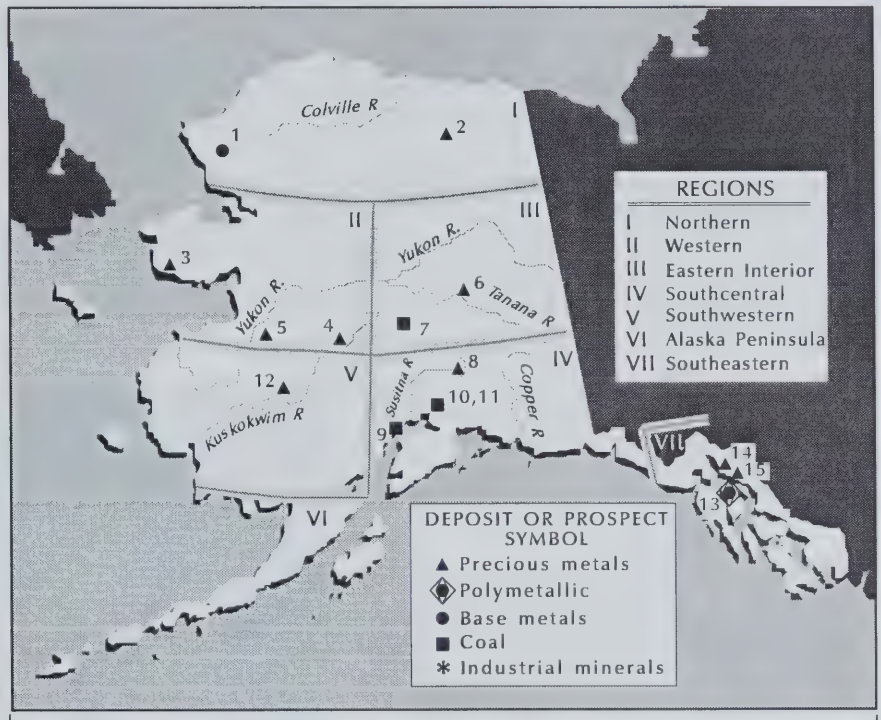
Sphinx Natural Resources, working with Malvy Technology Inc., reported some stripping of overburden at the mine on Monument Creek in the Ruby–Poorman area.

EASTERN INTERIOR REGION

Mineral development expenditures in 1994 were $6.77 million, a decrease of 24 percent from the $8.92 million invested for development in 1993.

METALS

The largest development project in Alaska's eastern interior region and in the entire United States (Thomas, 1995) was the engineering, design work, and clearing



I Northern Region
1. Red Dog—Cominco Alaska Inc. (mill circuit)
2. Wiseman area—Silverado Mines (U.S.) Inc. (underground placer)

II Western Region
3. Nome area—Alaska Gold Co. (stripping pit)
4. Nixon Fork—Consolidated Nevada Goldfield (underground)
5. Illinois Creek—USMX Inc. (permitting)

III Eastern Interior Region
6. Fairbanks area
   a. Fort Knox, Fairbanks Gold Mining Inc. (bulk sampling, metallurgical testing, clearing)
   b. Several openpit and underground placer mines
7. Healy Clean Coal Project—Usibelli Coal Mine Inc.

IV Southcentral Region
8. Valdez Creek—Cambior Alaska Inc. (stripping, reclamation)
9. Beluga—DRven Co. (Baseline monitoring)
10. Wishbone Hill—Idemitsu Alaska Inc. (economic evaluation)
11. Evan Jones Mine—Hobbs Industries (underground renovation)

V Southwestern Region
12. Several placer mines (stripping overburden)

VI Alaska Peninsula Region

VII Southeastern Region
13. Greens Creek—Kennecott Greens Creek Mining Co. (access drifting)
14. Kensington Mine—Couer Alaska Inc./Echo Bay Alaska Inc. (engineering and baseline studies)
15. Alaska-Juneau Mine—Echo Bay Alaska Inc. (portal and access drifts, ramps and declines)

Figure 10. *Selected mineral development projects in Alaska, 1994.*

by Fairbanks Gold Mining Co. at its Fort Knox Mine. Most of the state permits were in hand by February 1994, followed by the U.S. Army Corps of Engineers wetland (Sect 404 of the Clean Water Act) permit in May. This final permit acquisition, the last of a total of 41, makes it possible for mine development to commence.

During the second and third quarters of the year the project was subject to a significant internal review, and in October the engineering contract was let to Ford, Bacon and Davis Inc. of Salt Lake City. Also in October, Fairbanks Gold applied for an air quality permit which was issued in 1995.

By year end the ground clearing for the freshwater reservoir, the tailings impoundment, the millsite, and the access roads had all been completed. Early in 1995 Morrison-Knutsen Co. was selected as general contractor, and Kiewit Pacific Co. was subcontracted to complete the earthwork.

Several placer mines throughout the district reported development. In the Fairbanks district the Hopen Operation stripped overburden on Cleary and Little Eldorado Creeks. At the mouth of that creek the Little Eldorado Group advanced 700 feet (213 meters) of decline to reach the deeply buried gold placer deposit. Sam Skidmore reported development at his underground operation on Vault Creek. Polar Mining stripped frozen overburden at its year-round mine in the Lower Goldstream Valley. Yellow Eagle Mining began permitting and development of its operation near Ester. Herning Exploration and Mining prepared ground for mining on Palmer Creek in the Upper Chena drainage.

Delima Placers had a busy season doing roadwork and stripping at its operation on American Creek near

Figure 11. *Ed Armstrong of Silverado Mines Inc. inspects a reclaimed mine area of Thompson's Pup in the Koyukuk-Nolan district of northern Alaska. Alaska's placer mining companies now reclaim opencut mines, access trails, and other disturbed mining areas in compliance with state and federal regulations. (Photo by Dick Swainbank)*

Figure 12. *Joy 12 CM-5 continuous miner outside entry of the Kuchiak Research Mine. Nine feet (2.7 meters) of the 15-foot (4.6 meter) K3 seam is exposed in this photo. (Photo by Mike Belowich)*

Manley. BDH Mining reported stripping on the North Fork of Twelvemile Creek near Circle. Busby Mining removed overburden at Lost Chicken Creek. Fortyfive-Pup Mining stripped the creek of the same name in the Fortymile district.

Coal

Usibelli Coal Mine Inc. used auger-drilling to develop reserves at the Two Bull Ridge area near its existing operations near Healy.

The Healy Clean Coal Project received approval of all permits by mid-1994, and construction under the management of H.C. Price Co. will begin in 1995. This 50-megawatt plant will be adjacent to the existing 25-megawatt mine-mouth plant, but will emit less than half the amount of oxides of sulfur and nitrogen than the existing plant, despite its using coal of lower quality.

In a related development. the State appropriated the funds to upgrade the electrical intertie between Healy and Fairbanks to allow more efficient distribution of power. Golden Valley Electric Association, the local electrical cooperative with headquarters in Fairbanks, received the first shipment of power poles for the 32-mile (51-kilometer) transmission line to the Fort Knox Mine about 15 miles (24 kilometers) northeast of Fairbanks. When it is in full operation Fort Knox will use about 35 megawatts of power.

SOUTHCENTRAL REGION

Development investment in southcentral Alaska in 1994 was $995,000, less than 20 percent of the 1993 amount, which was reported as $5.56 million. Most of the 1993 development was done by the Valdez Creek Mine, which is scheduled for closure in 1995. Most of the 1994 expenditure was for coal development.

Metals

Empire Exploration reported some development of its placer ground near Yentna, and several operations noted some stripping, road building or movement of equipment.

Coal

DRven Corporation did some environmental baseline monitoring at the Diamond Chuitna Project, and Idemitsu-Alaska Inc. had reported evaluating the economics of the Wishbone Hill deposit. Hobbs Industries continued work that they had started the previous year at the Evan Jones Mine. A decline designed to undercut a caved portion of the seam was driven about 400 feet (122 meters) in 1993 but was too steep for the equipment and had collapsed by 1994. The decision was made to rehabilitate a crosscut tunnel which had been used as access to the Number 3 seam from 1925 to

Figure 13. *F.S. Air Service of Anchorage unloads Casa aircraft at the Nixon Fork copper-gold project about 35 miles (50 kilometers) northeast of McGrath in western Alaska. During mine development the modern underground operation has been supplied mainly by aircraft. Gold-copper production is expected to begin in the fall of 1995. Ore concentrates will be flown out with DC-6 aircraft. (Photo by Richard Flanders)*

1959. The first 300 feet (91 meters) of the 7-by-13-foot (2-by-4-meter) tunnel is through landslide deposits and requires intensive roof support. This work will continue in 1995. Reclamation of older work has been continuous throughout the process (fig. 14).

SOUTHWESTERN REGION

Metals

Only $35,000 in development expenditures was reported in 1994, and all of the activity consisted of stripping overburden at gold placer mines. Paul Sayer reported a small amount of stripping at the Little Creek Mine, and Lyman Resources of Alaska reported stripping on Ruby and Queen Creeks in the Aniak district.

SOUTHEASTERN REGION

Mineral development investment in southeast Alaska, reported to be $21.04 million in 1994, was up dramatically over the $557,636 reported in 1993. Large advanced-exploration projects of prior years, such as that at the A-J Mine or Kensington Mine, switched to mine-development activity. This switch accounts for most of the increase in development expenditure between 1993 and 1994.

Metals

Echo Bay Alaska continued with development of its A-J Mine near Juneau in 1994, converting the Sheep Creek rail portal and adit for trackless mining, strengthening the portal area and providing avalanche protection, driving ramps and declines within the existing reserve areas, and driving exploration drifts for future access.

The main effort in 1994 was in permitting. The mine has a completed Environmental Impact Statement and Large-Mine Permit from the City and Borough of Juneau. Alaska Coastal Zone Consistency authorizations are in progress.

At year-end the federal Environmental Protection Agency (EPA) issued a Technical Assistance Report (TAR) for the U.S. Army Corps of Engineers to assist the Corps in its decision whether to allow Echo Bay to build a tailings dam for the A-J Mine in Sheep Creek. According to EPA news release (December 30, 1994) the report concluded, "There seems to be no way to avoid harm to water quality or to offset the loss of wildlife habitat from the proposed reopening of the Alaska-Juneau gold mine."

Rather than contest conclusions in the TAR, Echo Bay has announced that it will be seeking project changes that will satisfy the EPA. Of great significance to the project, in May 1995, during preparation of this report, the EPA announced that it would investigate the

Figure 14. *Lower crosscut tunnel accesses coal seams at the Evan Jones Mine about 20 miles (32 kilometers) northeast of Palmer in southcentral Alaska. Formely the Evan Jones mine produced coal for steam heat and electric power. Hobbs Industries continued development of high quality bitiminous coal resources in the Evan Jones Mine and continued research of both domestic and export market possibilities. (Photo by Mike Belowich)*

merits of submarine tailings disposal (STD) for the A-J project. The EPA had previously maintained that it would not examine or permit this alternative, even though many experts had asserted that STD was the most environmentally benign option for the project.

At the Kensington Mine, 50 miles (80 kilometers) north of Juneau, Echo Bay had a fifty-fifty joint-venture with Coeur Alaska Inc. in which Echo Bay was the operator. As at the A-J, the 1994 work entailed obtaining the permits to develop the mine. The project has a complete Environmental Impact Statement, a Large Mine Permit from the City and Borough of Juneau, and a preliminary Coastal Zone Consistency Determination from the state. The Kensington project was also the subject of an EPA Technical Assistance Report for the Corps of Engineers, which dealt mainly with water quality issues related to the tailings impoundment and effluent discharge into the marine environment. The report issued in December 1994, found the project deficient in six areas, mainly related to tailings storage and effluent discharge. The EPA suggested operational changes to address its concerns, and the joint-venture has since made suggested project modifications.

During the preparation of this report (May 1995) Coeur Alaska made an offer of a $32.5 million cash payment for Echo Bay's 50 percent of the Kensington project. In addition to the cash payment the agreement is subject to a scaled royalty payment to Echo Bay on the first million ounces of Kensington gold production. The royalty ranges from one percent at a gold price of $400 per ounce ($14 per gram) to a maximum of 2.5 percent at a price of $475 per ounce ($16.63 per gram).

The various boards of the companies have agreed in principle to this arrangement, which will give Coeur Alaska Inc. 100 percent ownership of the Kensington Mine. Proven and probable reserves are estimated as 13.6 million tons (12.3 million tonnes) grading 0.143 ounces per ton (4.9 grams per tonne) of gold, or 1.95 million ounces (60,658 kilograms) of contained gold.

Kennecott Greens Creek Mining Company and partner Hecla Mining Company reported that about 70 people were employed at the minesite during 1994, driving about 4,700 feet (1,433 meters) of drifts to facilitate drilling and sampling. A preliminary feasibility study was also completed, which incorporates the reserves in the new southwest Alaska orebody.

Work scheduled for 1995 includes rebuilding the shiploader, rebuilding and expanding the concentrator shed, various water diversion projects, and redesign of the coarse-ore pad and tailings disposal areas. About 20,000 feet (6,096 meters) of drifting and 1,200 vertical feet (366 meters) of spiral ramp will be required to access the southwest ore. In May 1995 the Greens Creek Joint Venture announced that the mine would reopen in late 1996 or early 1997.

Snow Lion Mining reported some development activity at its mine on Cahoon Creek, a tributary to Porcupine Creek.

PRODUCTION

The value of Alaska's mineral production for 1994 is estimated at $507.5 million, an increase of $58.8 million, which is 13.1 percent above 1993 levels (table 8). Total gross values for individual commodities are zinc, 58 percent; gold, 14 percent; sand and gravel, 8 percent; coal, 7 percent; building stone, 5 percent; lead, 5 percent; silver, 2 percent; and all other commodities including platinum, jade, and peat, 1 percent. Figures 15, 16, and 17 graph the gold, sand and gravel, and coal production, three important components of Alaska's mineral industry.

The authors of this report compiled the mineral production statistics from data supplied by 244 placer gold, coal, lode metallic, and industrial mineral mines and quarries that operated in all seven regions of the state. Selected mine sites in each geographic region are shown in figure 18. Mineral production estimates were derived from: (1) data from 196 DGGS mineral questionnaires (as of May 31, 1995) returned by Native corporations, mining companies, individuals, and government agencies; (2) a phone survey of selected metal, industrial mineral and recycling firms; (3) from Alaska Placer Mining Application (APMA) records supplied by the Division of Mining & Water Management; and (4) from regional materials-use summaries supplied to DGGS by the Alaska Department of Transportation and Public Facilities, the U.S. Bureau of Land Management, and the U.S. Forest Service.

Thirty-one percent of the industrial mineral producers and all energy-mineral respondents provided unit values for many mineral commodities. We compute unit value of metals by averaging 12 monthly commodity prices that were published in the *Mining Journal Ltd.* with production information from other mining publications. Hence, value estimates for each metal listed in table 8 do not take into account transportation, refining or other financial costs incurred during the mining process.

As in 1993, metals again dominated Alaska mineral production and accounted for 79 percent of the 1994 mineral product value. Increased metal output—both volume and value—accounted for practically all the

Table 8. *Estimated mineral production in Alaska, 1992–94*[a]

	Quantity			Estimated values[b]		
Metals	**1992**	**1993**	**1994**	**1992**	**1993**	**1994**
Gold (ounces)	262,530	191,265	182,100	$ 88,463,000	$ 68,640,800	$ 70,290,600
(kilograms)	8,163	5,948	5,663			
Silver (ounces)	9,115,755	5,658,958	1,968,000	34,913,341	24,333,519	10,391,040
(kilograms)	283,500	175,994	61,205			
Platinum (ounces)	W	3	5	W	1,235	2,065
(grams)	W	95	158			
Lead (tons)	68,664	38,221	36,447	31,585,440	13,759,560	25,512,900
(tonnes)	62,278	34,667	33,065			
Zinc (tons)	274,507	268,769	329,003	301,957,700	236,516,720	296,102,700
(tonnes)	248,978	243,774	298,472			
Tin (pounds)	1,500	21,000	W	5,910	50,610	W
(kilograms)	680	9,526	W			
Subtotal				**$456,925,391**	**$343,302,444**	**$402,299,305**
Industrial minerals						
Jade and soapstone (tons)	1.5	2.6	2.3	$ 30,000	$ 20,000	$ 20,000
(tonnes)	1.4	2.4	2.1			
Sand and gravel (million tons)	14.6	13.2	13.5	42,200,000	40,636,815	40,950,651
(million tonnes)	13.2	11.9	12.3			
Building stone (million tons)	2.9	3.6	3.8	22,971,000	26,205,784	27,038,008
(million tonnes)	2.6	3.3	3.5			
Subtotal				**$ 65,201,000**	**$66,862,599**	**$68,008,659**
Energy minerals						
Coal (tons)	1,531,800	1,586,795	1,490,000	$ 38,300,000	$ 38,103,600	$ 36,750,000
(tonnes)	1,389,340	1,439,223	1,351,730			
Peat (cubic yards)	70,000	72,000	87,900	400,000	445,000	439,500
(cubic meters)	53,552	55,051	67,208			
Subtotal				**$ 38,700,000**	**$ 38,548,600**	**$ 37,189,500**
TOTAL				**$560,826,391**	**$448,713,643**	**$507,497,464**

[a]Production data from DGGS questionnaires, USBM file data (for 1991), phone interviews with mine operators and land owners, Alaska Department of Transportation and Public Facilities, and other sources.
[b]Values for selected metal production based on average prices for each year; for 1994—gold ($386/ounce); silver ($5.41/ounce); zinc ($0.45/lb); lead ($0.35/lb); platinum ($413/ounce). All other values provided by mine operators.
W=Withheld.

13 percent increase in mineral production from 1993 to 1994. Metal values increased from $343.3 million in 1993 to $402.3 million in 1994, an increase of 17 percent, due mainly to zinc output from the Red Dog Mine. In fact, the 329,003 tons (298,472 tonnes) of zinc that made its way to international markets from the Red Dog project accounted for 59 percent of all the mine-produced zinc in the United States and about 6.5 percent of the world's mine-produced zinc. This level of production firmly established Cominco's mine as one of the world's major metal-commodity players.

Alaska silver production fell from 5.66 million ounces (176 tonnes) in 1993 to 1.97 million ounces (61 tonnes) in 1994, a reduction of 65 percent. This sharp decline in Alaska silver output was caused by the closing of the polymetallic Greens Creek Mine on Admiralty Island in southeastern Alaska and by reduced silver recovery from concentrates shipped from the polymetallic Red Dog Mine. In the next few years the Red Dog Mine, and possibly the Greens Creek Mine, and the state's placer gold mines will proceed with silver recovery. The Greens Creek Mine, which closed in 1993, may reopen in 1997.

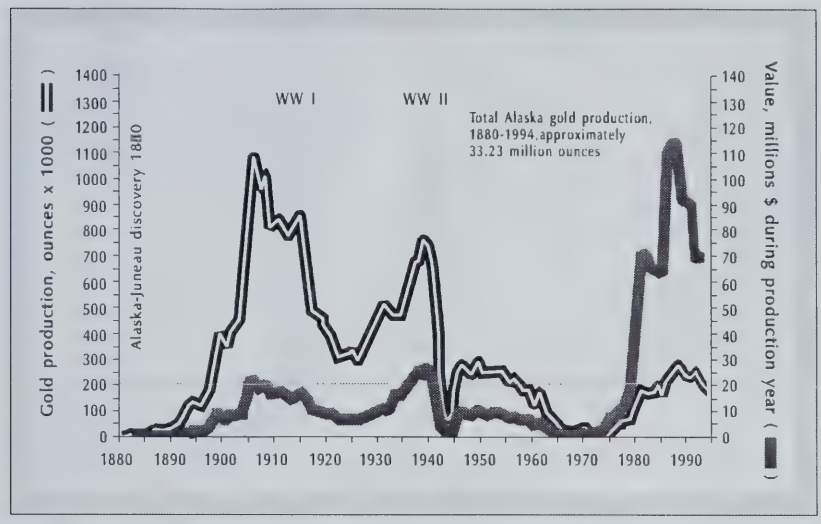


Figure 15. *Amount and value of gold production in Alaska, 1880–1994.*

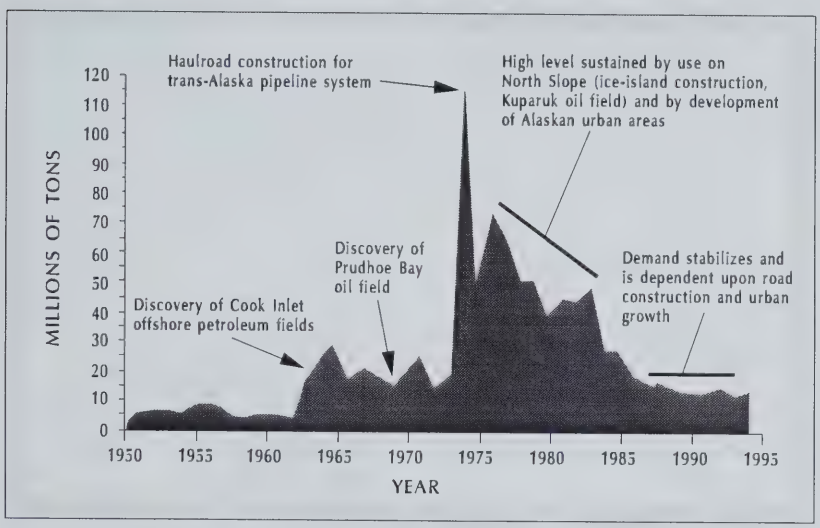


Figure 16. *Sand and gravel production in Alaska, 1950–94.*

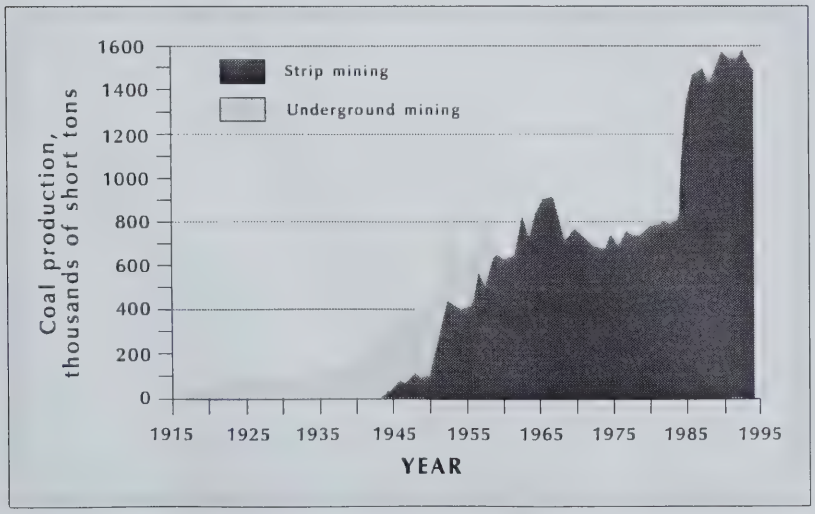


Figure 17. *Coal production in Alaska, 1915–94.*

In 1994 Alaska's mines produced an estimated 182,100 ounces (5,663 kilograms) of refined[6] gold worth $70.3 million from 182 placer mines in 1994, compared with 191,265 ounces (5,948 kilograms) of gold worth $68.6 million that was produced from 196 placer and one lode mine in 1993 (table 9). An 8 percent decline in the number of placer mines caused the 5 percent decline in gold production. The closing of the Greens Creek polymetallic mine also contributed to the overall decline in Alaska gold production. However, gold price increases actually resulted in a 2 percent rise in the value of gold mining from 1993 to 1994.

Large placer mines traded production ranking in gold output, but there has been a slow but steady decline in the number of small-to-medium sized placer operations in eastern interior, southcentral, and southwestern regions of the state. In addition, the announced 1995 closure of Cambior Alaska's Valdez Creek Mine in southcentral Alaska and expected shutdowns of other large placer operations in the next few years unfortunately will cause further production losses in the placer industry.

Despite these declines, placer mining continues to be a small-business-oriented industry that supplies many jobs in remote rural Alaska. With anticipated hardrock gold production from the Nixon Fork copper–gold skarn deposit in 1995, the Fort Knox porphyry gold deposit in 1996, and possibly the Illinois Creek silver-gold deposit in 1997, overall Alaska gold output should begin to rise again in the near future.

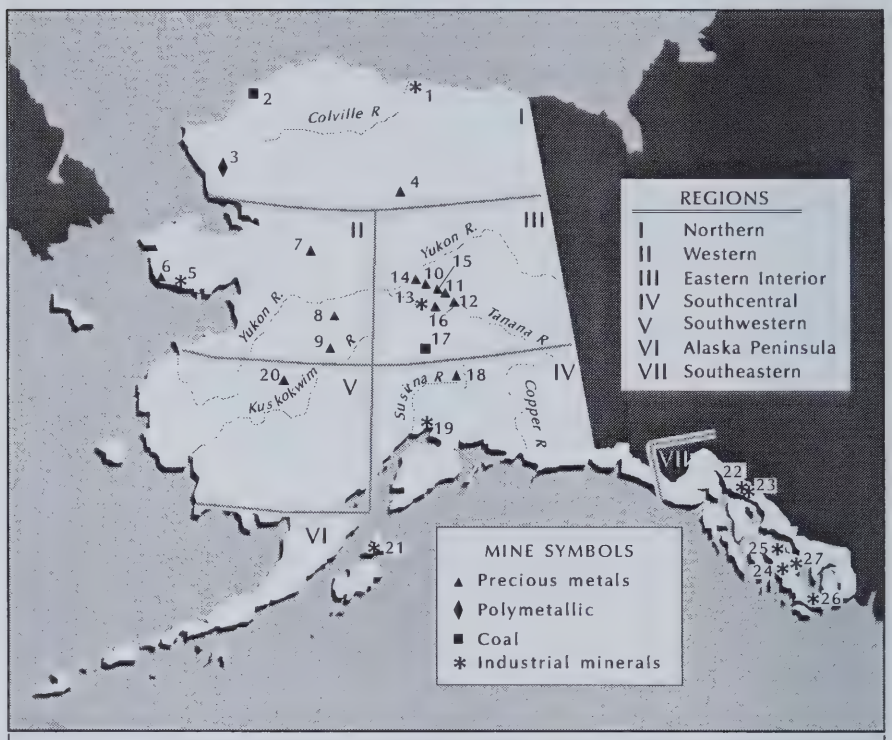
During 1994, every region of Alaska except the Alaska Peninsula reported gold production (table 9). Cambior's Valdez Creek Mine again topped the list with 47,622 ounces (1,481 kilograms) of gold, or 26 percent of the entire state's production.

[6]Throughout this report production quantities refer to *refined* gold unless stated otherwise.

Rounding out the top ten producers were Polar Mining Inc. on Lower Goldstream near Fairbanks; Alaska Gold Company near Nome; Silverado Mines in the Wiseman area; Alaska Placer Development near Livengood; Polar Mining Inc. on Fish Creek near Fairbanks; Nyac Mining Company south of Aniak; Cooks Mining near Fairbanks; Sphinx Natural Resources near Ruby; and Little Eldorado Group also near Fairbanks. These operations produced 104,222 ounces (3,241 kilograms) of gold or 57.5 percent of the statewide total. In previous years the ten top gold producers have accounted for 60 percent (1992), 57 percent (1991), 49 percent (1990), 61 percent (1989), 59 percent (1988), and 58 percent (1987) of statewide totals.

Operators cited fuel cost increases, equipment breakdowns, and decreasing gold grades as factors that increased mine costs in 1994. In 1994, the average cost to produce an ounce of Alaska gold was $343 ($11.00 per gram) up from $300 ($9.60 per gram) in 1993. Table 10 shows unit-cost figures from 172 Alaska placer mines that have responded to the DGGS questionnaire for the six years represented in the table. These 172 mines constitute 14 percent of the total 1,210 mines have been active during this time. The gold output of 506,087 ounces (15,739 kilograms) reported to us amounts to 41 percent of the total 1,239,543 ounces (38,549 kilograms) of placer gold produced in Alaska during the six years for which we have data (Bundtzen and others, 1994, table 11).

Alaska industrial mineral output totaled about $68 million



I Northern Region
1. Sagavanirktok River—gravel
2. Kuchiak Mine—coal
3. Red Dog Mine—lead-zinc-silver
4. Silverado U.S. Inc. mines—gold

Metallic mines 11
Industrial mineral producers 3

II Western Region
5. Cape Nome Quarry—rock, sand and gravel
6. Alaska Gold Co.—gold
7. Taiga Mining/Hogatza—gold
8. Green Mining and Exploration—gold
9. Rosander Mining Co.—gold

Metallic mines 34
Industrial mineral producers 5

III Eastern Interior Region
10. Alaska Placer Development—gold
11. Polar Mining Inc.—gold
12. Earthmovers—gravel
13. Thurman Oil & Mining—gold
14. Little Eldorado Group—gold
15. Paul and Company—gold
16. Cooks Mining—gold
17. Usibelli Coal Mining Inc.—coal

Metallic mines 112
Industrial mineral producers 17

IV Southcentral Region
18. Valdez Creek Mine—gold
19. Palmer/Wasilla area—gravel pits

Metallic mines 20
Industrial mineral producers 14

V Southwestern Region
20. Nyac Mining Co.—gold

Metallic mines 18
Industrial mineral producers 2

VI Alaska Peninsula Region

Metallic mines 0
Industrial mineral producers 2
21. Red Samm Construction—gravel

VII Southeastern Region
22. Hildre Sand and Gravel—gravel
23. Greens Creek Mine—zinc, silver, gold, lead
24. U.S. Forest Service—rock, sand and gravel
25. Sealaska Corporation—rock, sand and gravel

Metallic mines 3
Industrial mineral producers 15

Figure 18. *Selected production projects, 1994.*

Table 9. *Reported refined gold production, number of operators, and industry employment in Alaska, 1993–94*

Region	Number of operators		Production in ounces of gold		Number of employees	
	1993	1994	1993	1994	1993	1994
Northern	10	9	5,254 (164 kg)	10,292 (320 kg)	65	77
Western	34	32	49,733 (1,547 kg)	42,783 (1,374 kg)	294	255
Eastern interior	112	103	77,233 (2,402 kg)	69,511 (2,161 kg)	524	490
Southcentral	20	19	42,268 (1,313 kg)	49,723 (1,546 kg)	240	238
Southwestern	18	17	9,254 (288 kg)	9,650 (300 kg)	77	84
Southeastern	3	2	7,523 (234 kg)	141 (4 kg)	45[a]	6
TOTAL	**197**	**182**	**191,265 (5,948 kg)**	**182,100 (5,663 kg)**	**1,245**	**1,150**

[a]Includes a percentage of employment from Greens Creek polymetallic mine.

in 1994, about the same level as 1993, but there were significant regional changes (tables 9, 11, and 12). Sand and gravel use increased in the northern and eastern interior regions, but decreased in the western, southwestern, and southeastern regions. Stone production also increased in the northern Alaska Peninsula and southeastern regions, but was down in the western, eastern interior, and southcentral areas of the state. Values of industrial minerals vary greatly and depend on location, type of material marketed, and availability, which explains the wide price ranges for the unit values for each commodity depicted in tables 11 and 12.

Table 10. *Production costs for selected Alaska placer gold mines, 1990–94*

Mine size	1989	1990	1991	1992	1993	1994
			Number of mines			
Small[a]	11	8	21	23	19	24
Medium[b]	5	11	8	6	4	6
Large[c]	5	5	5	5	2	4
TOTAL	**21**	**24**	**34**	**34**	**25**	**34**
			Production in ounces			
Small[a]	2,977	1,856	3,582	3,842	3,919	2,789
Medium[b]	6,461	12,132	8,431	5,759	5,825	7,471
Large[c]	98,816	54,497	84,539	128,992	25,335	48,864
TOTAL	**108,254[d] (3,359 kg)**	**68,485[e] (2,124 kg)**	**96,552[f] (3,002 kg)**	**138,593[g] (4,310 kg)**	**35,079[h] (1,091 kg)**	**59,124[i] (1,839 kg)**
			Total reported mine cost in millions of dollars			
Small[a]	$ 784,177	$ 560,600	$ 1,018,606	$ 940,000	$ 1,031,500	$ 989,076
Medium[b]	1,538,000	3,314,000	2,518,239	1,460,000	1,905,125	2,597,782
Large[c]	31,972,300	18,990,000	31,857,228	41,650,000	7,605,000	16,706,600
TOTAL	**$32,294,477**	**$22,864,600**	**$35,394,073**	**$44,050,000**	**$10,541,625**	**$20,293,458**
			Unit cost per ounce			
Small[a]	$263	$302	$284	$245	$263	$354
Medium[b]	238	273	298	255	327	347
Large[c]	324	348	376	322	300	341
TOTAL	**$317**	**$334**	**$366**	**$318**	**$300**	**$343**

[a]10-650 oz gold/yr.
[b]650-2,500 oz gold/yr.
[c]>2,500 oz gold/yr.
[d]43 percent of total Alaskan placer gold production.
[e]36 percent of total Alaskan placer gold production.
[f]46 percent of total Alaskan placer gold production.
[g]61 percent of total Alaskan placer gold production.
[h]19 percent of total Alaskan placer gold production.
[i]32 percent of total Alaskan placer gold production.

Almost all coal production came from the Usibelli Mine at Healy in 1994. Production continued at levels of previous years. About 1.49 million tons (1.35 million tonnes) were produced for both domestic and export markets. Importantly, international coal prices began to improve late in 1994, which should greatly enhance the export markets for Usibelli coal.

NORTHERN REGION

Metals

Cominco Alaska, operator of the Red Dog Mine in northwest Alaska, mined and milled 2,339,500 tons (2,121,900 tonnes) of zinc-lead-silver ores, and produced 658,000 tons (596,940 tonnes) of zinc, lead, and bulk concentrates (table 13). A record 620,590 tons (563,000 tonnes) of polymetallic concentrates were shipped from the port of Kivalina to customers in Canada, Japan, South Korea, and Europe. Red Dog is owned by NANA Corporation (NANA) and operated by Cominco Alaska, the Alaska subsidiary of Canada-based Cominco Ltd. NANA is entitled to 4.5 percent of net-profits interest in Red Dog until Cominco recovers its interest and capital expenses. Then NANA's net profits entitlement is raised to 25 percent and increases by 5 percent each year until NANA's interest reaches 50 percent. Although Red Dog did not make a profit in 1994, it operated at a profit for the second half of the year. Improving economic performance at Red Dog was the result of larger zinc output coupled with stronger zinc prices (Ellis, 1995).

Concentrate production increased approximately 25 percent from 1993 to 1994 primarily by increasing the capacity of the grinding circuits in the mill. The $21 million grinding-circuit improvement project was completed in the fall of 1994. Overall zinc recovery continued to increase although lead and silver recoveries dropped somewhat due to the oxidized nature of the mill-run ores. Installation of the new tower mill and additional diesel-generating capacity was also completed late in the year.

Cominco continued to work with the Alaska Department of Environmental Conservation and the Department of Fish and Game to reduce the amount of metals in ground water leached from the shallow orebodies at Red Dog. Cominco is temporarily containing the waters while it designs and tests treatment facilities.

Due to unfortunate early icing conditions encountered in the Beaufort Sea, the annual Red Dog fuel barge failed to reach Kivalina in October. As a result, bulk fuels had to be flown to the mine site during the 1994–95 winter season. Everts Fuel of Fairbanks won the contract for the fuel-haul. Cominco provided 311 full-time jobs during the year. Half the workers were

Table 11. *Reported sand and gravel production and industry employment in Alaska by region, 1994*

Region	Companies and agencies reporting[a]	Tons	Estimated unit value ($/ton)[b]	Total value	Estimated number of employees
Northern	4	1,101,250	$4.75	$ 5,230,938	45
Western	3	426,000	5.25	2,236,500	20
Eastern Interior	14	5,533,135	2.60	14,386,151	225
Southcentral	9	5,562,516	2.80	15,593,440	263
Southwestern	2	178,600	2.48	444,390	12
Alaska Peninsula	2	113,400	2.50	283,500	10
Southeastern	7	603,420	4.60	2,775,732	65
TOTAL	**41**	**13,518,321 (12,263,821 tonnes)**	**$3.03**	**$40,950,651**	**640**

[a]From 24 returned questionnaires and 17 phone canvas responses.
[b]Values are based on price and cost estimates from 12 producers (29%) of the canvas and about 25 percent of the total product value.

Table 12. *Reported stone production and industry employment in Alaska by region, 1994*[a]

Region	Companies and agencies reporting[b]	Tons	Estimated unit value ($/ton)[c]	Total value	Estimated number of employees
Northern	1	115,356	$ 8.00	$ 922,848	5
Western	1	65,000	15.00	975,000	25
Eastern Interior	3	185,360	7.50	1,390,200	25
Southcentral	1	1,573	4.49	7,062	1
Southwestern	--	--	--	--	--
Alaska Peninsula	2	475,000	5.75	2,731,250	30
Southeastern	4	3,001,664	7.00	21,011,648	124
TOTAL	**12**	**3,843,953 (3,487,234 tonnes)**	**$ 7.03**	**$27,038,008**	**210**

[a]Includes riprap, shot rock, crushed stone, and building (ornamental) stone; does not include jade.
[b]Derived from12 questionnaires.
[c]Unit value based on data supplied by five operations or 42 percent of the total. Unit values for different stone products can vary widely.

NANA shareholders, and most of the rest commuted from other Alaska locations.

At the end of 1994, proven and probable reserves at Red Dog were 59.9 million tons (54.3 million tonnes) grading 5.5 percent lead, 18.3 percent zinc, and 2.71 ounces per ton (93 grams per tonne) of silver; an additional 15.5 million tons (14.1 million tonnes) grading 2.7 percent lead, 10 percent zinc, and 1.2 ounces per ton (41 grams per tonne) of silver are inferred. The nearby Hilltop orebody contains a resource of 8.8 million tons (8 million tonnes) grading 20 percent zinc, 6 percent lead, and 3.5 ounces per ton (120 grams per tonne) of silver.

State Alaska Placer Mining Application (APMA) records show that nine placer mines produced gold in the northern region and most of these were concentrated in the Wiseman area. An estimated 10,292 ounces (320 kilograms) of gold was produced in 1994, nearly twice the 5,254 ounces (164 kilograms) of gold produced in 1993 (table 9).

Silverado Mines (U.S.) Inc., during 1994, operated the largest gold mine in the northern region, and the fourth largest gold mine in Alaska. Silverado recovered 8,411 ounces (262 kilograms) of refined gold worth about $3.3 million from both underground and openpit placer mines that were operated in tandem on a year-round basis.

The Marys Bench underground drift mine produced about 3,400 ounces (106 kilograms) of gold during the winter, and the Eureka openpit that operated in the summer produced most of the balance of the bullion. On August 24, nearly 800 ounces (25 kilograms) of gold were taken during 32 hours of sluicing from the Eureka bench deposits. Marys Bench underground workings produced a high-purity 41.35 ounce (1,286 gram) gold nugget that is unofficially the tenth largest recovered from Alaska's placer fields.

Silverado estimated that approximately 50,500 ounces (1,571 kilograms) of gold remained as mineable placer reserves at the end of 1994. The two placer mines provided 14 full-time-equivalent jobs during the winter and summer mine operations. Silverado expects to achieve or exceed the established 1994 operational levels during the 1995 season.

Smaller placer mines operated in the Wiseman area. Compass Mining operated a small drift mine on Linda Creek. Slate Creek Mine worked a paystreak on Slate Creek near Coldfoot for 80 days. Gold Dust Mines operated for 139 days on two paystreaks owned by Little Squaw Gold Mining Company in the Chandalar district, east of Wiseman. B and B Mining was also active in the Chandalar area. Gold Dust worked much of the season on St. Marys Creek and a shorter time on Big Creek.

Table 13. *Cominco Alaska's Red Dog Mine, production statistics, 1989–94*

	1989	1990	1991	1992	1993	1994
Ore milled (tons)	33,300	998,700	1,599,300	1,582,000	1,874,800	2,339,500
(tonnes)	30,200	904,200	1,450,900	1,435,200	1,700,600	2,121,900
Ore grade						
Zinc	20.4%	26.5%	22.5%	19.9%	18.4%	18.8%
Lead	7.8%	8.5%	8.0%	6.0%	5.8%	5.7%
Silver						
(oz/ton)	3.6	3.8	2.8	2.9	2.8	2.8
(g/tonne)	123	130	96	99	96	96
Concentrate						
Zinc (tons)	N/A	337,400	410,700	405,900	465,600	588,100
(tonnes)		308,100	372,600	368,200	422,400	533,500
(grade)		58.9%	57.1%	57.0%	54.8%	55.8%
Lead (tons)	N/A	56,800	78,800	28,000	48,700	59,700
(tonnes)		51,400	69,500	25,400	44,200	54,160
(grade)		55.1%	57.2%	57.0%	50.9%	54.9%
Bulk concentrate (tons)	8,532	49,600	34,100	41,000	25,500	10,200
(tonnes)	7,740	45,000	31,000	37,200	23,100	9,300
Bulk concentrate (grade)						
Zinc	40.3%	31.7%	32.8%	23.0%	16.2%	19.8%
Lead	18.5%	22.9%	20.9%	27.0%	38.9%	36.0%
Total concentrate (tons)	8,532	443,600	521,400	474,900	539,800	658,000
(tonnes)	7,740	402,500	473,100	430,800	489,700	596,940
Employees	228	350	331	349	378	311

SOURCE: Jim Kulas, Cominco Alaska Inc.

Paradise Valley Mining again operated a commercial placer mine in conjunction with a tourist-oriented recreational gold venture on Birch Creek east of Wild Lake. Lounsbury Mining mined a small paystreak in the Middle Fork of the Koyukuk River drainage.

Industrial Minerals

Four questionnaire respondents reported that 1,101,250 tons (999,054 tonnes) of sand and gravel worth $5.2 million were mined in the northern region, about double the 559,800 tons (507,850 tonnes) of sand and gravel worth $2.5 million mined in 1993 (table 11). An additional 115,356 tons (104,650 tonnes) of stone worth $922,848 was quarried for local construction uses in 1994; there was no recorded stone production from the northern region in 1993 (table 12). The U.S. Bureau of Land Management (BLM) reported that it used various sand and gravel pits along the Dalton Highway for repair of the Dalton Highway and Trans-Alaska Pipeline System (TAPS). Alyeska Pipeline Service Company also produced gravel and rock from 20 material sites along the TAPS corridor, which include many of the BLM gravel pits previously mentioned.

B.P. Exploration mined approximately 113,030 tons (102,540 tonnes) of gravel from two mine sites on the North Slope. Much of their effort focused on infrastructure development of the Niakuk and Point McIntyre petroleum fields northwest of the giant Prudhoe Bay petroleum deposits. (B.P. Exploration expected the Niakuk field to produce 25,000–35,000 barrels of crude oil per day by mid 1995.) ARCO Alaska used approximately 48,860 tons (44,330 tonnes) of gravel for similar development purposes.

Stewarts Jewel Jade Company reported production of $20,000 worth of cut and polished jade that originated from Dahl Creek north of the Arctic Circle. Jade bookends constitute the bulk of the final products marketed by the Anchorage-based company.

Coal

At the Kachiak Mine, Hobbs Industries, working for Arctic Slope Regional Corporation, mined and stockpiled approximately 2,000 tons (1,814 tonnes) of high-quality bituminous coals during underground development activities in the Deadfall Syncline area. The stockpiled coal is expected to be used for continuing village home-heating needs and for further bulk metallurgical testing for potential export market opportunities.

WESTERN REGION

Metals

Information received through both APMA and DGGS questionnaires show that 32 placer mines in the western region recovered an estimated 42,783 ounces (1,374 kilograms) of gold and byproduct silver worth $16.3 million from the western region, down 14 percent from 1993 (table 9). The chief reason for the decline was reduced output from three large placer mines.

The leading gold producer was again the Alaska Gold Company, which operated two bucketline stacker dredges and one opencut mine in the Nome district. Both dredges are Yuba manufactured boats. Dredge 5 operated on either Third Beach or Monroeville Beach, an ancient shoreline of Norton Sound. With a displacement of 3,400 tons (3,084 tonnes), Dredge 5 has a daily digging capacity of 9,000 cubic yards (6,880 cubic meters). Dredge 6 worked a younger beach deposit west of the Nome Airport (fig. 19). With a displacement of 2,060 tons (1,868 tonnes), Dredge 6 has a daily digging capacity of 7,000 cubic yards (5,350 cubic meters). Dredge 6 may have seen its last productive season in the Nome district; the boat was mothballed in September, 1994. Dredge 5 operated for the entire 1994 season, and should operate through most of next season; future operations beyond 1995 are uncertain, however.

About 2 miles north of Nome Alaska Gold also operated an opencut placer mine that was developed by mechanical winter stripping and summer sluicing methods. Opencut mines using large earth-moving equipment are expected to take over most of the company's efforts in the Nome area. Alaska Gold produced 17,000 ounces (528 kilograms) of gold in 1994, 23 percent less than in 1993.

Dan Walsh mined high bench placers on Dexter Creek, while Bart Pettigrew worked auriferous pay on nearby Anvil Creek. Both creeks are among the largest producers of gold in the historic Nome mining district. Betty Krutzch mined placers in Specimen Gulch, an ancient bench level of Anvil Creek.

Steve's Repair (Steve Pomrenke) again mined an ancient shoreline of Norton sound near the Tripple and McDonald Creek drainages and washed 35,000 cubic yards (26,760 cubic meters) of auriferous pay. Pomrenke expects to have another successful season in 1995.

An estimated 125 hand miners and suction-dredge operators mined placer gold on public beach deposits along a 40-mile-long (60-kilometer-long) stretch of the Norton Sound coast. The majority of these beach miners, including Andy Hehnlin and Sons, operate on beaches from Hastings Creek to Cripple River, with a focus on ground immediately east and west of Nome (fig. 20).

East of the Seward Peninsula and into the lower Koyukuk and Yukon River basins, placer mining continued, but at reduced levels from previous years. Taiga Mining again leased the Hog River dredge from Alaska Gold Company and produced pay from virgin ground and dredge tailings.

Sphinx Natural Resources and Malvy Technology Inc. again operated the largest placer mine in the Ruby-Poorman district on Monument Creek and sluiced 30,000 cubic yards (22,940 cubic meters) of auriferous pay. Late in the year the operation was sold to Moose Creek Apartments of Fairbanks. Green Mining and Exploration took out a cut on Birch Creek.

Also in the Ruby-Poorman area Flat Creek Mining mined pay on Timberline Creek, while Carl Bracale Jr. worked on Camp Creek, in the Kaiyuh Hills.

Rosander Mining Company mined with a crew of five on Colorado Creek, tributary to Innoko River. Manzie Magnuson worked his ground on Madison Creek, also a tributary of the Innoko River.

Industrial Minerals

From the western region four questionnaire respondents reported production of 426,000 tons (386,470 tonnes) of sand and gravel worth $2.24 million and 65,000 tons (58,970 tonnes) of riprap worth $975,000. Martinsen Gravel and Crane supplied sand and gravel to DOTPF road reconstruction efforts along the Nome-Council Road. Sound Quarry Inc. and Sitnasuak Corporation again operated the Cape Nome Quarry and shipped high quality riprap to several Bering Sea coastal erosion projects.

East of the Seward Peninsula, Galena Construction Company continued to extract sand and gravel from dewatered Yukon River gravel bars near Galena on an as-needed basis.

Figure 19. *Alaska Gold Dredge Company's Dredge 6 at work on Submarine Bench, an ancient strandline west of the Nome airport. Dredge 6 was mothballed in September 1994 and is not expected to be restarted in the near future. Built from parts of USSR&M Dredges 1 and 3, the reconstituted Dredge 6 operated from 1955 to 1962 and from 1975 to 1994. (Photo by Tom Bundtzen)*

Figure 20. *Robert Hehnlin at work mining placer gold on the Nome beachline. (Photo by Debbie Hehnlin)*

EASTERN INTERIOR REGION

Metals

During 1994, all metal production in the eastern interior region consisted of gold and byproduct silver from placer mines. Although many of the region's mines benefited from increasing gold prices, the slow but steady decline in the number of placer operations that began three years ago continued into 1994. Our records indicate that an estimated 103 placer mines produced 69,511 ounces (2,161 kilograms), a decrease of 10 percent in gold and 8 percent in the number of mines from 1993 (table 9). Reductions in placer mining activity have been particularly evident in the Circle, Bonnifield, Richardson, and Tofty mining areas; other Interior districts including the Fairbanks, Livengood, Fortymile, Rampart, and Eureka camps maintained mine activity at about the same levels as in previous years.

Fairbanks was again the largest gold producing district of the eastern interior region. Twelve placer mines produced 26,214 ounces (815 kilograms) of gold worth $10.1 million in 1995; these levels were similar to levels of previous years. The Fairbanks district employed 116 workers.

Polar Mining Inc. operated two large placer gold mines in the Fairbanks district, and was Alaska's second largest producer of gold in 1994. The company processed 2.8 million cubic yards (2.14 million cubic meters) of auriferous gravel on Lower Goldstream Creek and 540,000 cubic yards (412,880 cubic meters) of auriferous gravel on Lower Fish Creek. Polar Mining provided 54 full-time-equivalent jobs to run both operations. Screened undersize and oversize aggregate from Polar's Lower Goldstream unit have become a popular upgraded product for the Fairbanks construction industry.

Cooks Mining again operated its long-time placer gold mine on Upper Fairbanks Creek. The company reported that the final mine cuts on the Upper Fairbanks ground will be finished in 1995; ground will be prepared for future operations on lower Fairbanks Creek starting in midsummer 1995. Alder Creek Mines sluiced a test cut adjacent to the old USSR&M Dredge Number 2 tailings on the south limit of Fairbanks Creek, but concluded that gold values and stripping and handling material costs made the cost of a mine operation currently prohibitive at that location.

Alf Hopen finished his long-time mining operation on Little Eldorado Creek and won a certificate of recognition from the State of Alaska for outstanding reclamation work. He will begin to mine a paystreak on Cleary Creek in 1995. Victoria Creek Mine Inc. was again active on Victoria Creek. Don Stein and Goldstream Valley Exploration worked pay on Gilmore Creek.

In the Ester Dome area, The Mining Company (John E. McClain) finished its last mining season on Ester Creek, and won the State of Alaska's first annual Reclamation of the Year Award for outstanding reclamation of previously mined land. Roger Moore was mining in a nearby stream drainage. The Roman operation was again operating in the Fairbanks and Fish Creek drainages.

Three underground drift mines reported production work in 1994. Little Eldorado Group sustained a full-scale, underground drift mining operation on Little Eldorado Creek, and mined 5,100 cubic yards (3,900 cubic meters) during late winter and spring of 1994 and processed the high grade, auriferous pay during the summer of 1994. Little Eldorado Group plans to expand the operation to process 35,000 cubic yards (26,760 cubic meters) annually beginning in 1995. Reserves are sufficient to maintain this level of operations for 6–8 years.

Sam Skidmore finally started underground production at his Vault Creek property, which he has been developing for several years now. Skidmore should be able to expand production levels somewhat in 1995. Reading Mine was again active in the nearby Treasure Creek drainage.

The Circle district was again one of the most active mining areas in the eastern interior region, but production levels continued to fall from previous years. Eleven operations reported 4,464 ounces (139 kilograms) of gold output worth $1.72 million. About 48 people were employed in these mines.

Points North operation on Portage Creek was the biggest producer of gold in the Circle district in 1994. A crew of four sluiced approximately 100,000 cubic yards (76,460 cubic meters) during a 120-day season. A similar mine operation is planned for 1995.

Paul and Company mined approximately 85,000 cubic yards (64,990 cubic meters) of pay on Porcupine Creek, but reported a substantial operating loss for the year. The company will relocate to Fryingpan Creek in 1995. Paul and Company had previously operated one of the largest placer gold mines in the Circle district.

Other placer mines reporting production in the Circle district include: DOXAUCO and BHD Mining on the North Fork of Twelve Mile Creek; Wilde Enterprizes on Switch Creek; Dan Fair on Ptarmigan Creek; Underwood Ore Mining Company at 114 Mile Steese Highway; Ed Lapp on Eagle Creek; Steve Olson also on Eagle Creek; Greenhorn Mining on Ketchum Creek; and Sam Koppenberg on Faith Creek.

Alaska Placer Development worked its Livengood Bench deposit for the eleventh consecutive year, and was the fifth largest gold producer in Alaska in 1994 (figs. 21 and 22). A crew of 8–10 processed about 156,000 cubic yards (119,280 cubic meters) of auriferous pay using opencut-hydraulic mine technology. The ground has

been leased from Coeur d'Alene Mines for years, but negotiations for outright purchase by Alaska Placer Development were in progress at the end of the year.

Five operations reported gold production in the Eureka-Manley and Rampart districts. Kelly Mining continued to mine pay on Eureka Creek near Manley but struggled with worn-out equipment. Ed Salter also mined a paystreak on Eureka Creek. Thanksgiving Mining worked on Thanksgiving Creek for 100 days but managed to sluice for only 32 hours at 35 yards per hour. Delima Placers mined 40,000 cubic yards (30,580 cubic meters) on American Creek for 90 days with a crew of three. Cassiterite Placers resumed operations at Tofty on ground previously leased by GHD Resources Inc.

The Forty Mile district was again dominated by smaller mechanized mines and suction dredge operations. APMA permits, Alaska Mining Licenses, and DGGS Questionnaires indicate that about 20 small operations were active. Roger Tallini worked pay with a large suction dredge on the South Fork of the Fortymile River; but his 1994 season was handicapped by low-water conditions. The long-time partnership of Mike Buzby and Alice Bayless leased ground from the Alaska Gold Company near Chicken. They worked the Mabel, Margaurite, Fisher, and Meyers bench deposits and conducted reclamation activities as well. Fortyfive Pup Mining continued their long-time operation on Fortyfive Pup, but encountered below-average pay and numerous equipment breakdowns. Larry Taylor worked ground on the main Fortymile River, but encountered "mile-high" paperwork problems with mine operations. Roger Tallini worked his suction dredge on the South Fork of Fortymile River (fig. 23). Cy Bras worked a placer deposit on Canyon Creek near Boundary (fig. 24).

Earl Voytilla worked his claims near the head of Tenderfoot Creek in the Richardson district. John Rubel took out a small cut in the saddle between Democrat and Junction Creeks, about 10 miles (15 kilometers) northwest of the Voytilla operation.

The Bonnifield district maintained production levels of last year, but mine operators couldn't regain production levels of several years ago when large-scale placer mines worked paystreaks on Grubstake and Moose Creeks. D'Log Industries (Ferrel Woods) mined ground on Bonnifield Creek and was encouraged with its 1994 test run of the pay zone, for which recovered values averaged about $4.00 per cubic yard ($3.06 per cubic meter), while mine costs ran about $1.75 per cubic yard ($1.34 per cubic meter). Gypsy Luck Mine and Tachick Mining Company mined pay in the Healy area, but both companies encountered equipment breakdowns and water control problems during the season.

Two mining companies reported gold production in the upper Delta River drainage. Glacier Six Enterprizes

Figure 21. *"Fish wheels" designed to remove slide-rock from the slurry drain at Alaska Placer Development's Livengood operation. (Photo by Dick Swainbank)*

continued large-scale production testing at its Broxson Gulch property west of Summit Lake. Much of the 1994 season was spent preparing for an expanded effort in 1995. Victory Mines worked ground on nearby Rainy Creek.

Wayne Gibson mined pay with a dragline operation on Golden Creek in the Tozi-Moran district west of Tanana. Mines in this placer district are usually credited with small amounts of tin byproduct during gold recovery.

Figure 22. *Hydraulic equipment washing away overburden exposed a cribbed shaft in the working face of the Alaska Placer Development's gold mine on the Livengood Bench, near Livengood. In the past, underground gold mines were worked by hand. Today's miners strip the loess from this paystreak with modern hydraulic equipment and mine the gold-bearing gravel with modern heavy equipment. (Photo by Dick Swainbank)*

Industrial Minerals

An estimated 5.53 million tons (5.02 million tonnes) of sand and gravel worth $14.4 million was quarried from pits throughout the eastern interior region. This level was about the same as that established in previous years (table 11). Much of this total was associated with Federal and State Department of Transportation and Public Facilities (DOTPF) highway reconstruction work, which used embankment and surfacing aggregate on the Alaska Highway and Taylor Highway projects. DOTPF reported that its projects included 5,241,178 tons (4,754,795 tonnes) of sand and gravel and fill dirt or nearly 95 percent of the total reported from the eastern interior region during 1994. One of the larger sand and gravel projects near Fairbanks, the Goldstream Road reconstruction project, used mine tailings from Goldstream Valley near Fox and used sized materials produced as a byproduct of Polar Mining's placer gold mine in Lower Goldstream Valley. The Goldstream Road project also reprocessed about 45,000 tons (40,820 tonnes) of blacktop stockpiled from previous road reconstruction efforts in the Fairbanks area.

Three companies reported that they used 185,360 tons (168,160 tonnes) of stone worth an estimated $1.4 million in the eastern interior, mainly for erosion control. DOTPF contracted work aimed at mitigating serious erosion control problems along the Richardson Highway near Delta, where the Tanana River has threatened the roadbed. Yutan Construction Company mined basalt for D-1 (asphalt applications) and riprap projects in the Fairbanks area.

Figure 23. *Roger Tallini operated a suction dredge on the South Fork of the Fortymile River during the 1994 season. In the last several years numerous suction dredges have been employed in the Fortymile district. (Photo by Roger Tallini)*

Coal and Peat

Usibelli Coal Mine Inc. produced steam coal for both interior electric power plants and for export to the Korean Electric Power Company (KEPCO) in Honam, South Korea. About half the 1.49 million tons (1.35 million tonnes) coal was used

in Alaska, and the remainder was shipped by Alaska Railroad Corporation unit trains to the Port of Seward for export. Contract negotiations with KEPCO were concluded on December 28, 1994, when an export agreement for 1995 was signed by Usibelli, KEPCO, and Suneel Shipping Company—for the first time in years, without a significant price reduction. International prices for steam coal rose significantly in late 1994 and in the spring of 1995, which is welcomed by Alaska's coal export industry.

Peat and fill dirt, mainly for landscaping applications, was reported by one operator, Great Northwest. The company mined approximately 20,000 cubic yards (15,290 cubic meters) of peat and fill dirt from their College Road pits, which are leased from the University of Alaska in Fairbanks.

SOUTHCENTRAL REGION

Metals

Gold production returns from ten mining companies and from APMA permit records show that gold production in the southcentral region increased from 42,268 ounces (1,313 kilograms) of gold in 1993 to 49,723 ounces (1,546 kilograms) of gold in 1994, an increase of 18 percent. Employment levels, however, remained the same for both 1993 and 1994 (table 9).

Cambior Alaska again operated Alaska's largest gold mine at its Valdez Creek placer property, about 55 miles (89 kilometers) east of Cantwell. During the year Cambior provided 151 full-time jobs, processed 1.26 million cubic yards (0.96 million cubic meters) of auriferous pay, and produced 47,622 ounces (1,480 kilograms) of refined gold (55,894 ounces or 1,738 kilograms of raw gold). This level of production makes the Valdez Creek operation one of the largest placer gold mines in the world. Cumulative production through eleven years of operation (1984-1994) has been 422,743 ounces (13,147 kilograms) of refined gold worth about $156 million at the time of bullion sales (table 14). On July 15, 1994, Cambior announced that the Valdez Creek property was entering its final productive stages, and was scheduled for permanent closure on September 30, 1995. Available reserves have apparently been exhausted and exploration has been discontinued. Cambior will begin a phased layoff of employees beginning March 31, 1995, which will continue until the mine closes. During 1994, the company began an aggressive

Figure 24. *Cy Bras feeds a trommel-screen washing plant on Canyon Creek of the Fortymile district near Boundary in eastcentral Alaska. The trommel is the same design used in floating, bucketline stacker dredges that are operated throughout Alaska. (Photo by Rick VanHatten)*

mine closure program emphasizing reclamation and related activities. The Valdez Creek Mine has been one of the largest single tax-revenue sources for the Matanuska-Susitna Borough.

Small-scale placer gold mines produced gold throughout southcentral Alaska. Girdwood Mining Company was the second largest gold mine in the southcentral region. Girdwood, with five employees, sluiced 35,000 cubic yards (26,760 cubic meters) of auriferous pay at their Girdwood Alaska operation and expect to operate at a similar level in 1995.

Arnold Mason conducted production tests for about 150 days in 1994 on his mine property in the Nelchina district, and expects to reach full production in 1995. Long-time placer miner Willie Mrak operated a small plant on his Ellie Number One claims on Willow Creek, using a crew of two that sluiced for about two hours a day during a 100-day mining season.

Three mining companies reported production from the Cache Creek-Yentna district. Empire Exploration Inc. and partner Aces High Inc. completed a 450-cubic-yard (344-cubic-meter) production test on a residual placer overlying the Blue Ribbon gold-quartz mesothermal vein deposit in the Yentna–Cache Creek district (fig. 25). The partnership plans to upgrade the production in 1995. Delays during 1994 were caused largely by the unfortunate death of Don Gates, who designed the washing plant for the two companies.

H and H Exploration and Mining worked a small paystreak on Boulder Creek in the Collinsville area and plans to do more exploration work in 1995 before further mining activity is resumed.

Lake Creek Placers Inc. continued a test cut on Lake Creek near Petersville in the Yentna-Cache Creek district. Lake Creek built a 26-mile-long (42-kilometer-long) winter haul road in the spring of 1994 and constructed an effluent pond in late summer. A test-sized washing plant began processing auriferous gravels in September before freeze-up. The company plans to install a 200-cubic-yard-per-day (153-cubic-meter-per-day) wash plant for use in 1995. Gold resources in the Lake Creek property are contained within a 500,000 cubic yard (382,300 cubic meter) placer deposit.

Three placer mines were active on the Kenai Peninsula. AG Building Supply worked a small placer paystreak with a suction dredge near Hope, and will continue the project in 1995. Gene Granath again worked his Falls Creek paystreak near Moose Pass and may expand his suction dredge operation in 1995. John Trautner continued to produce placer gold from his Canyon Creek deposits also near Moose Pass and worked on federal patent applications for the property.

Table 14. *Production of refined ounces of gold from Valdez Creek Mine 1984-94*

Year	Production (ounces refined)	Value (at time of sale)[a]
1984	19,627	$ 7,065,720
1985	29,833	9,606,226
1986	24,996	9,498,480
1987	21,068	9,585,940
1988	44,494	18,909,950
1989	62,403	22,980,500
1990	8,031	3,091,917
1991	43,057	15,586,634
1992	86,052	28,999,524
1993	35,560	12,766,040
1994	47,622	18,334,470
Total refined gold	**422,743**	**$156,425,419**
(Total raw gold)	**498,500**	

[a]Based on average annual gold prices for each calendar year; jewelry premiums from sale of gold nuggets or upfront sales agreements not taken into account.

Industrial Minerals

Nine companies and government respondents reported production of 5.56 million tons (5.04 million tonnes) of sand and gravel worth an estimated $15.6 million from the southcentral region (table 11). Major road reconstruction projects including the Sterling highway on the Kenai Peninsula, the Glenn Highway north of Anchorage, and the Richardson Highway north of Valdez accounted for 3.65 million tons (3.31 million tonnes) or nearly 66 percent of the regional volume totals. The Alaska Railroad Corporation shipped 2,060,429 tons (1,869,220 tonnes) of sand and gravel aboard unit trains from pits near Palmer to the Anchorage area for construction use throughout the municipality. This total is about 600,000 tons (635,040 tonnes) short of 1993 levels, but up from the railroad haulage estimates given during the 1989-1992 calendar years.

Chugach Alaska Corporation sold about 180,000 tons (163,300 tonnes) of sand and gravel from various locations in the southcentral region all subcontracted to third party vendors; they expect similar activity levels in 1995. Hermon Brothers Construction Company quarried pit-run gravel and crushed aggregate from pits in the Matanuska–Susitna valley for local markets. Alaska Gravel Sales operated pits on the corner of Platt Road and Lake Otis Blvd. in Anchorage. Melvin Tippston also worked his gravel operations in the Anchorage area.

Two companies quarried gravel in the Kenai–Soldotna area. Fairway Gravel provided pit-run gravel in the Funny River area. Jackson Construction Company

Figure 25. *Empire Exploration Inc. feeds a trommel-equipped washing plant with a backhoe at the Blue Ribbon Mine in the Cache Creek–Yentna district west of Talkeetna. (Photo by Dennis Garrett)*

dredged and baled gravel and sand from private property near Soldotna.

Rex Brown continued sand and gravel production in the Valdez area.

Peat

Three companies and one government agency produced about 67,900 cubic yards (51,920 cubic meters) of peat and fill dirt for landscaping applications in the southcentral region. A and A Services and The Dirt Company mined peat and fill dirt from several locations near Anchorage. Landscape Supply Company sold 9,000 cubic yards (6,880 cubic meters) of peat to landscaping companies in the Palmer–Wasilla area. DOTPF projects used about 35,000 cubic yards (26,760 cubic meters) of peat for landscaping newly rebuilt portions of the Glenn and Sterling highways.

SOUTHWESTERN REGION

Metals

Seventeen companies produced 9,650 ounces (300 kilograms) of gold worth $3.7 million in the southwestern region, about the same amount as in 1993 (table 9). Four operations produced gold in the Aniak-Tuluksak district. Nyac Mining Company, in partnership with Calista Corporation, operated the largest placer mine in southwest Alaska on Bear Creek south of Aniak, but at reduced levels of production from previous years.

Further north in the Donlin Creek area, Lyman Resources of Alaska leased ground from Calista Corporation and mined 7,000 cubic yards (5,350 cubic meters) of pay on Queen Gulch; they finally had a successful year from reliable, profitable ground. The old timers apparently missed much of the pay in the Gulch because of the wet and thawed conditions now being encountered by Lyman. The company anticipates an even better year in 1995. Other mining companies active in the Aniak-Tuluksak district include Millie Creek Mine near Red Devil and Mark Matter on Marvel Creek.

In the Marshall district Dave Penz operated Kako Creek Mine for the ninth consecutive year, but experienced problems with excessive rain and mechanical breakdowns. Ernie Chase took out a cut at Stuyahok west of Holy Cross, and will upgrade his operation in 1995.

In the Iditarod district, Prince Creek Mining took out cuts on their Valley Claim, managing to sluice only 103 hours during the season. Silt and clay in the payzone has caused excessive wear on the pumps and clogged the riffles during sluicing. Misco-Walsh Mining Company mined the residual placers atop the Golden Horn Mine near Flat using hydraulic methods, and recovered scheelite, auriferous arsenopyrite, and stibnite in addition to the gold. Ann Williams took out a cut on Granite Creek across from Otter Creek and about 2 miles (3.2 kilometers) from the Golden Horn Mine. Wilbur Williams, Ann Williams' husband and mining partner, who had mined in the district for nearly 45 years, was killed in an accident in Flat on July 1, 1994.

Others active in the district include Flat Creek Placers on Flat Creek and Richard Wilmarth on Chicken Creek. L.E. Wyrick has mined gold since 1985 on Granite Creek, a tributary to the George River.

Four mining companies reported production from the Innoko district west of McGrath. Little Creek Mine processed more than 50,000 cubic yards (38,230 cubic meters) of auriferous pay on Little Creek, a tributary to the Innoko River, and the company predicts "more of the same" for 1995. Anderson and Son Mining worked a paystreak on Yankee Creek for 120 days with a crew of three; no major problems were reported. The company plans to mine about 3 acres (1.2 hectares) in 1995.

Doug Clark and partners completed their first full season of placer mining on Ganes Creek, a major tributary to the Innoko River west of McGrath. Clark purchased the property from long-time mine operator Magnuson Mining Company in 1993. Work in 1994 concentrated on evaluating the auriferous pups along the east limit of Ganes Creek. Several large, multi-ounce gold nuggets were recovered from the pups. The nuggets undoubtedly were derived from the mineralized Ganes–Yankee Creek dike swarm, and not from ancient benches of Ganes Creek proper (Bundtzen, 1981; Miller and Bundtzen, 1994).

Robbie Roberts was again active on Ophir Creek, site of the original gold discoveries in the Innoko district.

Industrial Minerals

Two companies mined 178,600 tons (162,025 tonnes) of sand and gravel worth $444,390 in the southwestern region (table 11). Knik Construction Company mined gravel from a pit near the village of Platinum for sand and gravel use in erosion control and other applications in Bethel. Calista Corporation mined or sold 163,000 tons (147,870 tonnes) of sand and gravel from various sites throughout its region for local construction needs.

ALASKA PENINSULA REGION

Industrial Minerals

The City of Kodiak used sand and gravel from its Pillar Mountain pit and sand from Pillar Creek for local municipal needs. Koniag Inc. mined approximately 475,000 tons (430,920 tonnes) of rock used to construct a logging road on Afognak Island, and approximately 283,500 tons (257,190 tonnes) of sand and gravel for State DOTPF airport improvements.

SOUTHEASTERN REGION

Metals

Two small gold mines reported gold production in the southeastern region. Snow Lion Mining Company continued to dig pits and test gold content in the 85-foot-thick (26-meter-thick) paystreak of the Porcupine Creek drainage. This company uses a hydraulic winch that is the heart of a stackline excavator system, a technology that is considered essential in the boulder-ridden paystreak (figs. 26 and 27).

Big Nugget Mine processed another 10,000 cubic yards (7,646 cubic meters) of auriferous pay also on Porcupine Creek, near Haines. Big Nugget Mine encountered no serious problems, but they are worried about future reserves.

Although the Greens Creek polymetallic mine on Admiralty Island closed in 1993 (figs. 28 and 29), the owners and federal government have made an agreement that paves the way for reopening the mine. Kennecott-Greens Creek Mining Company, a past producer of silver, zinc, gold, and lead, will pay $1 million and up to 3 percent royalty to the USFS when the mine resumes production, In return USFS will open for development an additional 7,500 acres (3,036 hectares) of highly mineralized ground near the existing mine (Hoffman and Albanese, 1995; Apel, 1995).

Industrial Minerals

The southeastern region continued to lead the state in stone production. Southeastern stone together with its sand and gravel provided 78 percent of all the stone used throughout the state in 1994. Stone production amounted to 3,001,664 tons (2,723,110 tonnes), worth $21 million; sand and gravel production amounted to 603,420 tons (547,420 tonnes, worth $2.78 million (tables 11 and 12). The continuing high levels of stone production is the result of road construction associated with the forest products industry throughout the panhandle.

Hildre Sand and Gravel mined 105,700 tons (95,890 tonnes) of sand and gravel for local building needs from pits north of Juneau. Ritchie Transportation Company Inc. dredged sand and gravel from the Stikine River for building needs in and near Wrangell; Ritchie reported that 1994 was a good year. Highdrive Drilling and Blasting mined about 500,000 cubic yards (382,300 cubic meters) of both sand and gravel and stone for construction work on Prince of Wales Island. Ron Thomas worked sand and gravel pits near Hyder for local markets. Pate Construction quarried gravel at Yakutat for local commercial uses.

One small municipality reported industrial mineral mining activities. The City of Thorne Bay mined about 6,000 cubic yards (4,588 cubic meters) of shot rock for use in Thorne Bay; the rock pit is scheduled to be developed as commercial property after the mining is completed.

The Cordova and Petersburg offices of the U.S. Forest Service leased quarries to small companies that mined small tonnages of blend sand, rock, and sand and gravel to private construction firms during the year.

Sealaska Corporation quarried 2.40 million tons (2.18 million tonnes) of shot rock for various market uses throughout its region. Major problems listed by the corporation include permitting delays mainly related to water-use issues and to U.S. Forest Service Plan of Operation Approvals.

Figure 26. *Snow Lion Mining Company hydraulic winch system at work in the Porcupine district north of Haines in southeast Alaska. Power is supplied to the stackline by a 3-cubic-yard (2.3-cubic-meter) track loader with a 44,999-pound (20,412 kilogram) capacity hydraulic-pull winch. (Photo by Snow Lion Mining Company)*

Figure 27. *In the boulder-ridden Porcupine paystreak Snow Lion excavates and digs with a 2-cubic-yard (1.5-cubic-meter) dragline bucket rigged to a stackline system. (Photo by Snow Lion Mining Company)*

Figure 28. *Winter view of the Greens Creek polymetallic mine and mill facility on Admiralty Island, west of Juneau. The mine shut down in 1993, but new exploratory results and improving metal prices may lead to its reopening by 1997. (Photo by Al Clough)*

Figure 29. *Front-end loader stockpiles processed zinc concentrate at the Greens Creek Mine in 1993. (Photo by Al Clough)*

DRILLING

The total drilling reported in Alaska in 1994 was 467,878 feet (141,781 meters) compared with 277,531 feet (84,591 meters) in 1993 (fig. 30). Tables 15, 16, and 17 and contain the information reported for significant drilling programs, the summary drill footage reported over the last eight years, and the regional distribution of the 1994 drilling.

PLACER DRILLING

Placer drilling was reported in the northern region at Nolan Creek in the Wiseman area, and in the Fairbanks area.

COAL DRILLING

Arctic Slope Consulting Group had a modest coal drilling program associated with the exploration and development at the Kuchiak mine site in the northwest arctic coalfields, and Usibelli Coal Mine Inc. did a little drilling on Two Bull Ridge near Healy in interior Alaska.

HARD ROCK DRILLING

Almost 80 percent of the 438,000 feet (133,502 meters) of hardrock drilling in 1994 was core drilling, and about 68 percent of that 347,000 feet (105,765 meters) of core-drilling was underground drilling at the A-J and Greens Creek Mines.

Reverse-circulation drilling has, except for 1993, lagged behind core drilling, and in 1994 the amount of core drilling far exceeded reported reverse-circulation drilling.

Substantial hard-rock drilling programs in 1994

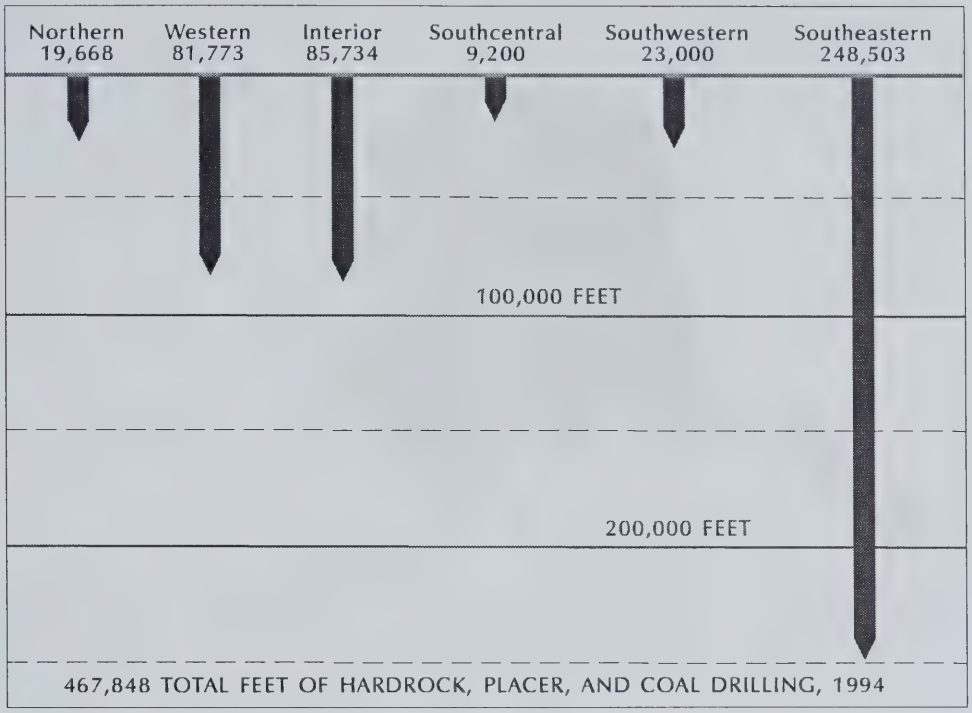


Figure 30. *Hard rock, placer, and coal drilling totals for 1994.*

were reported at Vinasale Mountain and Nixon Fork near McGrath; at Illinois Creek near Nulato; near Nome and Candle on the Seward Peninsula; at Fort Knox, True North, Ester Dome, and Stoneboy Creek near Fairbanks; at the Golden Zone and Zackley properties in the Alaska Range; at Goodnews Bay in southwest Alaska; at Haines, Prince of Wales Island; and near Juneau in southeast Alaska. This list shows that years of grassroots exploration has resulted in numerous targets throughout the state with sufficient potential to be worth a drill program.

Table 15. *Companies reporting significant drilling programs in Alaska in 1994*

Addwest Minerals Inc.	Kennecott-Greens Creek
Apollo Resources Inc.	La Teko Resources Ltd.
Arctic Slope Consulting Group	Noranda Exploration Inc.
ASA Inc.	Polar Mining Inc.
Cominco Alaska Exploration Inc.	Sealaska Corp.
Consolidated Nevada Goldfields Co.	Silverado Mines Ltd.
Echo Bay Alaska Inc.	Starcore Resources Ltd.
Fairbanks Gold Mining Inc.	USMX Inc .
Kennecott Exploration Inc.	WGM Inc.

Table 16. *Drilling footage reported in Alaska, 1986–94*[a]

	1986	1987	1988	1989	1990	1991	1992	1993	1994
Placer exploration	32,400	50,250	152,000	97,250	78,930	51,247	6,740	25,216	21,000
Placer thawfield	227,000	130,000	300,000	210,000	105,000	130,000	65,000	--	--
Placer subtotal	**259,400**	**180,250**	**452,000**	**307,250**	**183,930**	**181,247**	**71,740**	**25,216**	**21,000**
Coal subtotal	**28,800**	**19,900**	**26,150**	**38,670**	**18,195**	**16,894**	**12,875**	--	**8,168**
Hardrock (core)	--	95,600	223,630	242,440	648,600	205,805	211,812	124,325	347,018
Hardrock (rotary)	--	19,500	130,220	89,790	112,355	110,850	148,022	127,990	91,692
Hardrock subtotal	**50,200**	**115,100**	**353,850**	**332,230**	**760,955**	**316,655**	**359,834**	**252,315**	**438,710**[b]
TOTAL (feet)	**338,400**	**315,250**	**832,000**	**678,170**	**963,080**	**514,796**	**444,449**	**277,531**	**467,878**
TOTAL (meters)	**103,144**	**96,088**	**253,593**	**206,700**	**293,547**	**156,910**	**135,502**	**84,591**	**141,781**

[a]Does not included 756,000 feet of rotary blast-hole drilling in 1993.
[b]Includes 236,803 underground coring.
-- Not reported.

Table 17. *Drilling footage by region in Alaska, 1994*

Type of drilling	Northern	Western	Eastern interior	South-central	South-western	Alaska Peninsula	South-eastern	TOTAL
Placer exploration	13,000	--	8,000	--	--	--	--	21,000
Placer thawfield	--	--	--	--	--	--	--	--
Placer subtotal	**13,000**	**--**	**8,000**	**--**	**--**	**--**	**--**	**21,000**
Coal subtotal	**6,668**	**--**	**1,500**	**--**	**--**	**--**	**--**	**8,168**
Hardrock core	--	61,773	9,542	4,200	23,000	--	248,503	347,018
Hardrock rotary	--	20,000	66,692	5,000	--	--	--	91,692
Hardrock subtotal	**--**	**81,773**	**76,234**	**9,200**	**23,000**	**--**	**248,503**	**438,710[a]**
TOTAL (feet)	**19,668**	**81,773**	**85,734**	**9,200**	**23,000**	**--**	**248,503**	**467,878**
TOTAL (meters)	**5,960**	**24,780**	**25,980**	**2,788**	**6,970**	**--**	**75,304**	**141,781**

-- Not reported.
[a]Note that 236,803 feet of core-drilling was underground.

METAL AND MINERAL PRODUCT RECYCLING INDUSTRY

Alaska's 1994 metal and mineral product recycling industry continued at about the same levels as in 1993. Total value was estimated at $5.9 million in 1994, compared with about $6.3 million in 1993 (table 18). The industry employed about 55 people on a year-round basis statewide. Volume of nonferrous scrap exported from Alaska declined from 2,651 tons (2,405 tonnes) in 1993 to 2,518 tons (2,284 tonnes) in 1994, a decline of 5 percent. However, improving copper, aluminum, and lead recycling prices resulted in a value increase for nonferrous metal from $3.5 million in 1993 to $4.0 million in 1994, an increase of 14 percent (table 18). Both the value and volume of ferrous scrap decreased about 27 percent, mainly due to a reduction in ferrous scrap deliveries from the North Slope petroleum fields.

Table 18. *Reported scrap metal and mineral-based recyclable products exported from Alaska, 1992–94*[a]

Commodity	1993 Quantity pounds	1993 Quantity kilograms	1993 Estimated value[b]	1994 Quantity pound	1994 Quantity kilograms	1994 Estimated value
Nonferrous scrap						
Aluminum	2,526,664	1,146,095	$1,617,064	2,423,669	1,099,376	$1,866,078
Brass	110,795	50,257	243,749	160,724	72,904	353,593
Copper	582,680	264,304	635,121	678,354	307,701	915,778
Lead[c]	1,701,700	771,891	252,306	1,750,000	793,800	612,500
Radiators	11,696	5,307	35,088	15,492	7,027	46,476
Stainless steel	11,253	5,104	56,265	7,510	3,406	37,550
Undistributed nonferrous scrap	356,420	161,672	712,840	--	--	--
Subtotal	**5,301,208**	**2,404,630**	**$3,552,433**	**5,035,749**	**2,284,214**	**$3,831,975**
Ferrous scrap	63,656,860	28,874,751	2,705,416	51,046,000	23,154,466	2,083,860
Glass	1,034,000	469,022	N/A	532,000	241,315	N/A
Plastic (HDPE#2)	--	--	--	20,000	9,072	N/A
TOTAL	**69,992,068**	**31,748,403**	**$6,257,849**	**56,633,749**	**25,689,067**	**$5,915,835**

[a]All production data in 1993 and 1994 provided by K & K Recycling Inc. (Fairbanks), Jackovich Construction and Industrial Supply Inc. (Fairbanks), Alaska Metals Recycling (Anchorage), Anchorage Recycling Center (Anchorage), Battery Specialist (Anchorage), BP Exploration (Anchorage), ABS Alaskan (Fairbanks), and United Battery Services (Portland, Oregon).
[b]Value estimates determined from both 1993 and 1994 commodity prices of refined metal or scrap as reported in *Mining Journal* and from estimates provided by individual scrap dealers. We emphasize that price estimates do not include transporation, preparation, or refining costs.
[c]Lead volume estimates judged to be conservative for both years.
-- Not reported.

Most Alaska scrap dealers benefited from a sharp increase in copper and aluminum prices in the fourth quarter of 1994, and aluminum shipments in particular are expected to be brisk in 1995.

Improving lead prices allowed virtually all scrap dealers surveyed to expand their lead-acid battery collection efforts, although the amount of lead reported to be shipped from the state remained at almost the same level for both 1993 and 1994, a yearly average of 863 tons (783 tonnes) of lead. Despite the drop in 1994 production, ferrous scrap demand from the nations of the Pacific Rim continued to be strong.

K & K Recycling Inc. (K & K) continued to lead Alaska metal recycling efforts in the interior region. The company processed 361,618 pounds (164,030 kilograms) of nonferrous scrap and 1,637,797 pounds (742,900 kilograms) of ferrous scrap, down about one-third in both categories from 1993 levels due mainly to a drop in aluminum can and Fairbanks area ferrous scrap dealerships. Most nonferrous scrap handled by K & K is shipped by tractor-trailer to dealers outside Alaska, and the ferrous scrap is usually shipped via the Alaska Railroad Corporation to the coast.

Nonferrous metal, glass, and plastics recycling in southcentral Alaska was again dominated by the Anchorage Recycling Center (ARC) of Anchorage (fig. 31). ARC recycled 2,608,000 pounds (1,182,990 kilograms) of nonferrous scrap and all the glass and plastic reused in Alaska (table 18). ARC continued to research the use of glass and plans to market crushed glass for solid-waste disposal systems and other "clean aggregate" applications. Although overall aluminum recycling volumes were down from 1993 to 1994, ARC sponsored the "Great Aluminum Can Roundup" in Anchorage area schools and collected approximately 40,000 pounds (18,144 kilograms) of aluminum in 1994, nearly double the amount collected in 1993. BP Exploration recycled more than 1,783 pounds (809 kilograms) aluminum at BP facilities in Anchorage and on the North Slope; proceeds from the sale of the aluminum were given to Covenant House in Anchorage.

Alaska Metals Recycling of Anchorage baled and shipped 20,180 tons (18,202 tonnes) of ferrous scrap to Japan, about the same amount shipped by the company to markets in Taiwan in the last two previous years. BP Exploration recycled 4,600 tons (4,173 tonnes) of ferrous scrap, including spent drill steel, from their facilities on the North Slope.

ABS Alaska continued to ship spent lead-acid batteries from its battery manufacturing plant in Fairbanks to processing plants in California. This battery recycling accounted for about 30 percent of the statewide lead recycling total (table 18).

United Battery Systems (UBS) of Portland Oregon and its Anchorage subsidiary, Battery Specialists Inc., hauled most of the remaining lead-acid batteries, about 1,200,000 pounds (544,320 kilograms), to processing plants outside the state. Both firms coordinate the collection of batteries from many bush communities and the North Slope.

Most metal recycling companies believed that their businesses would increase scrap shipments from Alaska in 1995, citing fundamental improvements in market demand for both ferrous and nonferrous scrap. Although many in the general public view the metal and minerals recycling business as an environmental cleanup effort, much of the ferrous scrap and selected nonferrous commodities are profitably recovered by Alaska small businesses. In addition, some firms incorporate value-added components such as lead-acid batteries to be sold here in Alaska.

GOVERNMENT ACTION

On May 5, 1994, Fairbanks Gold Mining Inc. (FGMI) received a Clean Water Act Section 404 (wetlands) permit from the Corps of Engineers for its Fort Knox Mine. This permit was the last major federal requirement, and in November FGMI started to clear the vegetation and overburden from the pit area, the conveyor and millsite, the tailings dam, and the fresh water reservoir. Fort Knox is the first major hardrock mine to be permitted on state-owned land.

The Healy Clean Coal Project southwest of Fairbanks also received the last permit necessary to begin construction in June 1994, but work at the site had to be delayed until 1995.

Permits were also a prominent feature of the activity at the Alaska-Juneau (A-J) and Kensington Mines near Juneau. The U.S. Environmental Protection Agency (EPA) issued a Technical Assistance Report for the Kensington Mine that and owners have said the report detected no fatal flaws. However, the EPA report concluded that the tailings dam at the A-J Mine, as designed, would harm water quality or wildlife. Echo Bay Alaska Inc., owner of the A-J, is investigating alternatives to the Sheep Creek tailings impoundment.

The Alaska Mineral's Commission made several recommendations in its 1994 report to the Governor and legislature about legislation needed to enhance mineral development. Some of these suggestions were submitted to the legislature for consideration, and two House Bills were enacted into law.

House Bill 132 is "An act to extend the time period of all permits issued by the state relating to the extraction or removal of resources if the holder of the permits,

or any of the agencies issuing a permit to the holder, is involved in litigation concerning the issuance of validity of any permit related to the extraction or removal." Any mining operation will require several permits, with differing term limits, so that one or more permits can expire during the course of prolonged litigation. Rather than have the permitee reapply for expired permits, this legislation allows the clock to stop until the permit can be used.

House Bill 333 is "An Act amending the Alaska Land Act to define the term 'state selected land' for the purpose of recognizing mining locations and giving retrospective effect to the amendment; and providing for an effective date." This Act recognizes that there is a period of time between the State selecting the 103 million acres (41.7 million hectares) of unencumbered federal land promised to the state as an entitlement under the Statehood Act and the actual transfer of title to that land. From the time of selection, no federal mining claims may be located, and because the state has no ownership rights to the land until the federal government grants tentative approval of the selection, the state was unable to accept state mining claims. This problem was recently compounded when the federal government began to charge $100 per federal claim per year as a rental fee for federal claims. Many of the owners of federal claims in areas surrounded by state-selected land expressed the desire to convert their federal claims to state claims.

Taxes in Alaska include the municipal taxes, the State Mining License Tax, and the Federal and State Corporate Income Tax. Table 19 summarizes taxes paid by the mining industry (excluding the state corporate income tax) to the State of Alaska during the last four calendar years. Recent changes in state tax law prevent municipalities from taxing in-situ resources, but fixed assets and goods may be taxed.

The final land selections of its 103-million-acre (41.7-million-hectare) entitlement were filed by the state in 1994.

At the request of the Fairbanks Industrial Development Corporation, the legislature appropriated $400,000 to allow the State Division of Geological & Geophysical Surveys to conduct aeromagnetic and electromagnetic surveys of the Fairbanks and Richardson mining districts during 1994. The maps containing the results of the surveys were released on February 7, 1995.

The Division of Mining & Water Management, presented the first annual Reclamation of the Year award to John E. McClain of The Mining Company for outstanding work on Ester Creek west of Fairbanks. Certificates of Recognition were awarded to Fairbanks district miners Jack and Greg Neubauer of Cassiterite Placers Inc. for their work on Fox Creek, and to Alf Hopen for his reclamation of Little Eldorado Creek. John Brown received the same award for his work on the North Fork of Harrison Creek in the Circle district, and Doug Clarke won similar recognition of his reclamation in the Upper Chena drainage. The State will annually recognize responsible miners for exemplary work in returning disturbed ground to a useful condition as required by State law.

Table 19. *Revenues paid to the State of Alaska by Alaska's mineral industry, 1991–94*[a]

	1991	1992	1993	1994
State claim rentals	$626,164	$537,355	$523,661	709,568
Production royalties	11,736	7,815	7,917	12,015
Mining license	598,971	465,163	425,607	481,907
Coal rents and royalties				
Royalties	$1,188,063	$1,294,825	$1,486,100	1,399,912
Rents	130,363	198,835	198,835	198,835
Subtotal	**1,318,426**	**1,493,660**	**1,684,935**	**1,598,747**
Material sales				
Mental Health	34,141	104,845	5,300	54,772
Division of Land	706,220	491,235	561,414	174,484
SPCO	0	161,408	150,000	136,752
School fund	3,548	3,279	3,011	1,564
Subtotal	**743,911**	**760,769**	**719,725**	**367,571**
Total	**$3,299,208**	**$3,264,752**	**$3,361,845**	**$3,169,809**

[a]Does not include state corporate income taxes, which were not released for this study, or taxes paid to individual municipalities.

ALASKA MENTAL HEALTH LANDS SETTLEMENT

The Alaska Mental Health Lands litigation reached an interim solution in 1994. The legal action against the state halted lease and purchase transfers of millions of acres of mineralized Alaska state lands. The settlement awarded cash for surface values and reconstructed most of the original one-million-acre Alaska Mental Health Lands Trust.

BRIEF HISTORY OF ALASKA MENTAL HEALTH LANDS TRUST

In 1956, before statehood, the Territory of Alaska was given the one-million-acre (404,690 hectare) Alaska Mental Health Lands Trust (AMHLT), which was a component of the Alaska Mental Health Enabling Act. The trust was confirmed and incorporated into the 1959 Alaska Statehood Act, which instructed the state to manage trust lands in order to generate revenues for mentally disabled Alaska citizens. In 1978 the Alaska Legislature abolished the AMHLT. Subsequently, the Alaska Department of Natural Resources (DNR) sold, leased, or classified as special-use areas more than half the AMHLT lands.

WEISS V. STATE OF ALASKA

In 1984 an Alaska Superior Court decision (Weiss v. State of Alaska) ruled that the Alaska Mental Health Lands trust had been illegally dissolved by the Alaska legislature. In 1985 this decision was upheld by the Alaska Supreme Court. The courts ordered the state to reconstitute AMHLT as nearly as possible to the original form and reimburse the trust for lands that had been sold or leased. Both compensations were to be offset by mental-health expenditures made by the State of Alaska since 1978.

Notable mineral projects potentially affected by the litigation included the Wishbone Hill (Idemitsu), Beluga (DRven Corporation), and Healy (Usibelli) coal deposits, and the Fort Knox gold mine (Fairbanks Gold Mining Inc.).

CHAPTER 66 SETTLEMENT

In 1991 the Hickel administration introduced the Chapter 66 Settlement, which would reconstitute remaining AMHLT lands (about 480,000 acres, [194,260 hectares]) and add to the Trust new hypothecated (pledged as security) lands that were judged to be of equal value to the Trust lands that had been disposed of by the state. In 1993, the Superior Court rejected portions of the Chapter 66 Settlement in part because a cash settlement was not included. In addition, the Chapter 66 Settlement did not reconstitute the AMHLT land base as had been specifically instructed by previous court rulings.

INTERIM RESOLUTION REACHED IN 1994

During the spring of 1994, DNR combined the expertise of the Division of Mining & Water Management (DMWM), the Division of Lands (DOL), and the Division of Geological & Geophysical Surveys (DGGS) to help resolve the disputed land settlement.

In order to replace lands of equal value that were removed from the Mental Health Land Trust as ordered by the courts, DGGS systematically evaluated the mineral endowment of several proposed replacement-land tracts. To complete these evaluations, DGGS used modern methods of determining and estimating the probable value of in-place mineral resources in the replacement land tracts.

DMWM picked about 202,000 acres (81,820 hectares) of replacement tracts in the Haines–Skagway, Salcha–Chena, and Ophir areas of southeastern, eastern interior, and southwestern Alaska for DGGS to analyze. In addition, DMWM successfully argued to the court that modifications should be made to mineral-value assumptions used by the plaintiffs representing the Trust in Weiss v. State of Alaska in placing value on lost AMHLT lands. DOL served as project manager of the entire effort and closely monitored the evaluation process.

As a result of the mineral-resource evaluation study, a new settlement proposal was crafted as House Bill 201 and passed by the Alaska Legislature. Governor Hickel signed the bill into law during the first special session of 1994. This legislation mandated the following:

1. Established a trust for mental health programs that awarded $200 million for surface estate values, and a reconstituted land base of 960,000 acres (388,610 hectares). About half the land base, 480,000 acres (194,300 hectares), was original mental health lands and the other half was reconstituted lands packaged by the Department of Natural Resources team.
2. Established a Mental Health Trust Authority to oversee the AMHLT assets.
3. Recommended development policy.
4. Created a separate unit in the Department of Natural Resources to manage the Alaska Mental Health Lands Trust lands on behalf of the newly created Mental Health Trust Authority.

On July 29, 1994, in the Superior Court in Fairbanks, Justice Mary Greene granted preliminary approval of the AMHLT settlement crafted by the state and passed by the legislature. However the court noted that several problems should be solved before final court approval would be granted. The problems were: (1) monies raised by state land contracts were less than anticipated in the AMHLT legislation that was enacted 1994, (2) the court recommended that parts of the Chena-Salcha replacement tract would not be included in the settlement, and (3) errors and omissions in the settlement package needed correction. The Superior court also recommended that the state close all remaining settlement lands to mineral entry.

To address the problems identified by Superior Court Justice Mary Greene, Governor Hickel called a second Special Session of the Alaska Legislature on September 26, 1994. A new bill, Senate Bill 383, added new replacement lands as identified by DNR and removed others recommended by the court for exclusion. Senate Bill 383 was passed on September 28, 1994, and provided for a net gain of about 66,746 acres (27,020 hectares) to the settlement. This action brought the new total land trust package to 995,502 acres (402,980 hectares). Senate Bill 383 also instructed DNR to close all remaining open AMHLT lands to mineral entry.

In October 1994, DNR issued land orders that explained the impact of the legislatively ordered mineral closures and provided descriptions of the new lands added to the Trust.

On December 14, Superior Court Justice Mary Greene issued her "Memorandum Decision and Order Granting Final Approval to House Bill 210 Settlement. This court action (1) dissolved a 1992 court injunction, (2) vacated a 1986 court-ordered Mineral Closing Order on all original Mental Health Lands, and (3) dismissed the Weiss v. State of Alaska lawsuit. Judge Greene upheld the temporary Mineral Closing Order ratified by Senate Bill 383 in September until regulations regarding their development were in place. Judge Greene's ruling set the deadline for appeal as January 13, 1995. Plaintiffs of the Mental Health Lands Trust filed an appeal on the day of the deadline and provided their Statement of Reasons detailing their arguments against Judge Greene's December 1994 decision on January 27, 1995. No date for hearing this appeal has been issued at the time of this writing.

The map inside the back cover shows generalized locations of Mental Health Trust Lands in Alaska.

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APPENDIX A

Total active claims and new claims staked in 1992, 1993, and 1994[a] (listed by quadrangle)[b]

Compiled by Erik Hansen

	Quadrangle	Active claims assessment work 1992	1993	1994	New claims staked Federal 1992	1993	1994	State 1992	1993	1994	Total active claims[c] 1992	1993	1994
13	Umiat	0	0	0	0	0	0	0	0	0	**0**	**0**	**0**
14	Sagavanirktok	0	0	0	0	0	0	0	0	0	**0**	**0**	**0**
15	Mt. Michelson	0	0	0	0	0	0	0	0	0	**0**	**0**	**0**
17	Point Hope	0	0	0	0	0	0	0	0	0	**0**	**0**	**0**
18	De Long Mts.	1,384	661	760	0	0	0	0	0	144	**1,384**	**661**	**904**
23	Philip Smith Mts.	3	2	1	0	0	0	0	0	0	**3**	**2**	**1**
26	Noatak	66	0	0	0	0	0	0	0	0	**66**	**0**	**0**
27	Baird Mts.	125	7	7	0	0	0	0	0	0	**125**	**7**	**7**
28	Ambler River	117	71	68	0	0	0	0	5	189	**117**	**76**	**257**
29	Survey Pass	32	34	34	0	0	0	0	0	0	**32**	**34**	**34**
30	Wiseman	1,279	962	851	4	278	39	48	5	55	**1,331**	**1,245**	**945**
31	Chandalar	548	394	270	0	9	9	16	16	21	**564**	**419**	**300**
32	Christian	1	1	0	0	0	0	0	0	0	**1**	**1**	**0**
35	Kotzebue	13	28	28	0	0	0	15	15	0	**28**	**43**	**28**
36	Selawik	0	0	0	0	0	0	0	0	0	**0**	**0**	**0**
37	Shungnak	22	0	0	0	0	0	0	0	0	**22**	**0**	**0**
38	Hughes	54	54	54	0	0	0	0	0	0	**54**	**54**	**54**
39	Bettles	266	136	12	0	10	15	0	0	6	**266**	**146**	**33**
43	Teller	327	258	143	0	0	0	0	0	0	**327**	**258**	**143**
44	Bendeleben	792	530	401	0	0	0	15	13	4	**807**	**543**	**405**
45	Candle	433	313	351	0	0	0	20	4	11	**453**	**317**	**362**
47	Melozitna	85	49	65	0	0	0	0	24	6	**85**	**73**	**71**
48	Tanana	1,025	929	550	0	0	0	66	70	177	**1,091**	**999**	**727**
49	Livengood	2,740	3,049	2,955	0	33	0	288	153	146	**3,028**	**3,235**	**3,101**
50	Circle	3,386	2,440	2,675	0	0	0	520	477	256	**3,906**	**2,917**	**2,931**
51	Charley River	183	178	32	0	0	0	0	0	0	**183**	**178**	**32**
52	Nome	420	67	115	23	4	0	30	11	43	**473**	**82**	**158**
53	Solomon	360	117	216	0	0	0	12	8	56	**372**	**125**	**272**
54	Norton Bay	110	0	0	0	0	0	0	0	0	**110**	**0**	**0**
55	Nulato	1,631	1,591	1,588	0	0	0	0	5	0	**1,631**	**1,596**	**1,588**
56	Ruby	768	668	444	0	0	0	30	27	29	**798**	**695**	**473**
57	Kantishna River	80	44	44	58	0	0	0	0	0	**138**	**44**	**44**
58	Fairbanks	1,518	2,260	2,670	0	0	0	131	195	143	**1,649**	**2,455**	**2,813**
59	Big Delta	2,842	2,902	2,652	88	0	0	363	213	408	**3,293**	**3,115**	**3,060**
60	Eagle	1,448	968	1,048	0	0	0	131	170	171	**1,579**	**1,138**	**1,219**
63	Unalakleet	0	0	0	0	0	0	0	0	0	**0**	**0**	**0**
64	Ophir	342	362	290	0	0	0	61	15	109	**403**	**377**	**399**
65	Medfra	255	254	285	0	0	0	0	2	30	**255**	**256**	**315**
66	Mt. McKinley	238	273	93	0	0	0	0	2	0	**238**	**275**	**93**
67	Healy	3,001	1,629	1,228	12	0	0	44	90	195	**3,057**	**1,719**	**1,423**
68	Mt. Hayes	1,678	1,207	1,049	2	0	12	2	80	163	**1,682**	**1,287**	**1,224**
69	Tanacross	520	374	316	0	0	0	101	14	18	**621**	**388**	**334**
72	Holy Cross	12	6	6	0	0	0	0	0	0	**12**	**6**	**6**
73	Iditarod	568	222	262	3	6	0	11	0	13	**582**	**228**	**275**
74	McGrath	290	75	75	0	0	0	0	0	0	**290**	**75**	**75**
75	Talkeetna	940	869	728	2	0	0	183	68	120	**1,125**	**937**	**848**
76	Talkeetna Mts.	723	514	525	1	0	0	117	61	45	**841**	**575**	**570**
77	Gulkana	17	3	3	0	0	0	0	2	0	**17**	**5**	**3**
78	Nabesna	337	191	96	0	0	0	0	0	0	**337**	**191**	**96**
81	Russian Mission	43	40	40	0	0	0	0	0	0	**43**	**40**	**40**
82	Sleetmute	158	109	122	0	0	0	0	0	8	**158**	**109**	**130**
83	Lime Hills	12	12	14	0	0	0	0	0	2	**12**	**12**	**16**

[a]Total count based on all documents recorded through January 1, 1994.
[b]Quadrangles numbered northwest to southeast according to DGGS-DOM numbering and Kardex systems.
[c]Excluding an undetermined number of claims on state-selected land.

APPENDIX A—Continued

	Quadrangle	Active claims assessment work 1992	1993	1994	New claims staked Federal 1992	1993	1994	State 1992	1993	1994	Total active claims 1992	1993	1994
84	Tyonek	4,200	4,713	2,112	0	0	0	82	67	0	**4,282**	**4,780**	**2,112**
85	Anchorage	596	441	367	7	0	3	78	64	56	**681**	**505**	**426**
86	Valdez	341	25	41	0	0	0	18	0	2	**359**	**25**	**43**
87	McCarthy	187	209	132	0	0	0	0	0	0	**187**	**209**	**132**
91	Bethel	43	35	48	0	0	0	0	4	1	**43**	**39**	**49**
92	Taylor Mts.	246	90	94	0	0	0	2	0	0	**248**	**90**	**94**
93	Lake Clark	295	335	335	0	0	0	1	0	66	**296**	**335**	**401**
94	Kenai	11	12	3	0	0	0	0	0	0	**11**	**12**	**3**
95	Seward	1,322	157	586	67	95	51	13	13	32	**1,402**	**265**	**669**
96	Cordova	1	0	0	3	0	0	1	0	0	**5**	**0**	**0**
97	Bering Glacier	255	390	152	0	0	0	0	0	1	**255**	**390**	**153**
101	Goodnews	0	0	0	0	0	0	0	0	0	**0**	**0**	**0**
102	Dillingham	0	0	0	0	0	0	0	0	219	**0**	**0**	**219**
103	Iliamna	1,140	631	650	0	0	0	147	0	0	**1,287**	**631**	**650**
104	Seldovia	10	10	7	0	0	0	0	0	2	**10**	**10**	**9**
105	Blying Sound	0	0	0	0	0	0	0	0	0	**0**	**0**	**0**
107	Icy Bay	0	0	10	0	0	0	6	14	0	**6**	**14**	**10**
108	Yakutat	11	1	1	0	0	0	0	0	0	**11**	**1**	**1**
109	Skagway	483	430	392	92	1	1	0	99	318	**575**	**530**	**711**
111	Mt. Fairweather	1	2	2	0	0	0	0	0	0	**1**	**2**	**2**
112	Juneau	2,663	1,399	1,509	58	76	27	25	20	3	**2,746**	**1,495**	**1,539**
113	Taku River	0	0	0	0	0	0	0	00	0	**0**	**0**	**0**
114	Sitka	171	57	47	27	8	39	4	0	0	**202**	**65**	**86**
115	Sumdum	82	75	4	0	0	0	0	0	0	**82**	**75**	**4**
116	Port Alexander	1	0	0	0	0	1	0	0	0	**1**	**0**	**1**
117	Petersburg	532	180	193	51	19	1	0	0	0	**583**	**199**	**194**
118	Bradfield Canal	500	45	33	2	0	0	0	0	0	**502**	**45**	**33**
119	Craig	917	405	671	169	62	89	9	8	1	**1,095**	**475**	**761**
120	Ketchikan	206	114	158	1	0	0	0	0	0	**207**	**114**	**158**
121	Dixon Entrance	206	61	86	25	0	9	0	0	2	**231**	**61**	**97**
122	Prince Rupert	0	0	0	0	0	0	0	0	0	**0**	**0**	**0**
123	Hagemeister Island	216	196	196	0	0	0	0	0	0	**216**	**196**	**196**
126	Mt. Katmai	0	0	0	0	0	0	0	0	0	**0**	**0**	**0**
127	Afognak	2	2	1	0	0	45	0	0	0	**2**	**2**	**46**
128	Bristol Bay	0	0	0	0	0	0	14	0	0	**14**	**0**	**0**
130	Karluk	0	0	0	0	0	0	0	0	0	**0**	**0**	**0**
133	Chignik	67	22	10	0	0	0	0	0	0	**67**	**22**	**10**
135	Trinity Islands	115	92	79	0	0	0	2	8	1	**117**	**100**	**80**
138	Port Moller	17	0	11	0	0	0	0	0	93	**17**	**0**	**104**
TOTAL		**46,029**	**34,982**	**31,096**	**695**	**601**	**341**	**2,606**	**2,042**	**3,365**	**49,330**	**37,625**	**34,802**

APPENDIX B
1994 Prospecting sites on State lands
Compiled by Erik Hansen

	Quadrangle	New sites	Extensions	Total
19	Mishuguk Mtn.	1	0	**1**
27	Baird Mtns.	10	0	**10**
30	Wiseman	7	8	**15**
31	Chandalar	3	18	**21**
44	Bendeleben	7	0	**7**
47	Melozitna	7	0	**7**
48	Tanana	41	7	**48**
49	Livengood	82	22	**104**
50	Circle	113	444	**557**
52	Nome	13	22	**35**
53	Solomon	9	3	**12**
58	Fairbanks	45	5	**50**
59	Big Delta	46	23	**69**
60	Eagle	21	12	**33**
64	Ophir	2	0	**2**
65	Medra	0	8	**8**
67	Healy	36	49	**85**
68	Mt. Hayes	14	6	**20**
69	Tanacross	169	16	**185**
75	Talkeetna	4	15	**19**
76	Talkeetna Mtns.	8	0	**8**
83	Lime Hills	2	0	**2**
84	Tyonek	6	18	**24**
85	Anchorage	14	2	**16**
86	Valdez	13	4	**17**
103	Iliamna	4	0	**4**
109	Skagway	8	16	**24**
135	Trinity Islands	25	0	**25**
TOTAL		**710**	**698**	**1,408**

APPENDIX C

State and federal agencies and private interest groups involved in mineral development activities, 1994

(Note: The *1995 Service Directory of the Alaska Miners Association* lists technical and professional consultants and companies available for work in Alaska. The report is available for $12 from the Association's Anchorage office.)

STATE OF ALASKA AGENCIES

DEPARTMENT OF COMMERCE AND ECONOMIC DEVELOPMENT
State Office Building, 9th Fl.
P.O. Box 110800 (mailing)
Juneau, AK 99811-0800
(907) 465-2500

Function: *Promotes economic development in Alaska.*

Division of Economic Development
State Office Building, 9th Fl.
P.O. Box 110804 (mailing)
Juneau, AK 99811-0804
(907) 465-2017

751 Old Richardson Hwy., Suite 205
Fairbanks, AK 99701
(907) 452-7464

Function: *Primary advocacy agency in state government for economic growth. Researches and publishes economic data on Alaska's mining industry. Provides information and assistance to new or developing businesses. Attracts capital investment by advertising Alaska's resource potential. Provides research staff aid for the Alaska Minerals Commission.*

Office of International Trade
3601 C Street, Suite 798
Anchorage, AK 99503
(907) 561-5585
(907) 561-4577 (fax)

Function: *The Office of International Trade (OIT) encourages the development of new markets for Alaska resources; expands existing markets; locates sources of investment capital; increases the visibility of Alaska and its products in the international marketplace; and improves communication among members of the Alaska and international business community. OIT makes referrals and provides technical assistance to those interested in developing export markets for Alaska-produced or value-added goods and services. OIT also has representation in Japan, Korea, Taiwan, and Russia.*

DEPARTMENT OF ENVIRONMENTAL CONSERVATION
410 Willoughby Ave., Ste. 105
Juneau, AK 99801-1795
(907) 465-5010
Public Information (907) 465-5060

Function: *Issues permits for activities, including mining, that affect air or water quality or involve land disposal of wastes. Sets air- and water-quality standards. Inspects, monitors, and enforces environmental quality statutes, regulations, and permits. Reviews all federal permits.*

Northern Regional Office
610 University Avenue
Fairbanks, AK 99709-3643
(907) 451-2360

Southcentral Regional Office
555 Cordova St.
Anchorage, AK 99501
(907) 269-7500
Permit Information (907) 269-7500
(collect calls accepted)

Nome District Office
P.O. Box 1815
Nome, AK 99762-1815
(907) 443-2600
(907) 443-5961(fax)

Southeastern Regional Office
410 Willoughby Ave., Ste. 105
Juneau, AK 99801-1795
(907) 465-5350
Permit Information (907) 465-5342
(collect calls accepted)

DEPARTMENT OF FISH AND GAME
1255 W. 8th St.
P.O. Box 25526 (mailing)
Juneau, AK 99802-5526
(907) 465-4100

Habitat and Restoration Division
(907) 465-4105

Function: *Protects habitat in fish-bearing fresh waters and manages refuges, sanctuaries, and critical habitats. Requires permits for any work involving: the blockage of fish passage; equipment crossings or operation in fresh waters used by anadromous fish; use, diversion, or pollution of streams containing anadromous fish; construction, exploration, or development work in state game refuges, game sanctuaries, and critical habitat areas.*

Northern Regional Office
Habitat and Restoration Division
1300 College Rd.
Fairbanks, AK 99701-1599
(907) 459-7289

Southcentral Regional Office
Habitat and Restoration Division
333 Raspberry Rd.
Anchorage, AK 99518-1599
(907) 267-2285

Southeastern Regional Office
Habitat and Restoration Division
802 3rd St., 2nd Floor
P.O. Box 240020 (mailing)
Douglas, AK 99824-0020
(907) 465-4290

OFFICE OF MANAGEMENT AND BUDGET
Division of Governmental Coordination
240 Main St., Suite 500
P.O. Box 110030 (mailing)
Juneau, AK 99811-0030
(907) 465-3562

Function: *Conducts coordinated state review of permits for mining projects within Alaska's Coastal Management Zone. Provides information to applicants on project design for consistency with the policies and standards of the Alaska Coastal Management Program. Coordinates state response to direct federal actions, including proposed regulations, that affect Alaska's mining industry.*

Southcentral Regional Office
3601 C St., Ste. 370, Frontier Bldg.
Anchorage, AK 99503-5930
(907) 561-6131
(907) 561-6134 (fax)

Southeastern Regional Office
240 Main St., Suite 500
P.O. Box 110030 (mailing)
Juneau, AK 99811-0030
(907) 465-3562

DEPARTMENT OF NATURAL RESOURCES
400 Willoughby Ave., 5th Fl.
Juneau, AK 99801-1724
(907) 465-2400

Division of Forestry
3601 C St., Ste. 1034, Frontier Bldg.
Anchorage, AK 99503-5937
(907) 762-2501

Function: *Establishes guidelines to manage mining in state forests.*

Northern Regional Office
3700 Airport Way
Fairbanks, AK 99709-4699
(907) 451-2660

Southcentral Regional Office
3601 C St., Ste. 1008, Frontier Bldg.
Anchorage, AK 99503-5937
(907) 762-2117

Southeastern Regional Office
400 Willoughby Ave., 3rd Fl.
Juneau, AK 99801-1724
(907) 465-2491

Division of Geological & Geophysical Surveys
794 University Ave., Ste. 200
Fairbanks, AK 99709-3645
(907) 451-5000

Function: *Conducts geological and geophysical surveys to determine the potential of Alaska land for production of metals, minerals, fuels, and geothermal resources; locations and supplies of construction materials; potential geologic hazards to buildings, roads, bridges, and other installations and structures; and other surveys and investigations as will advance knowledge of the geology of Alaska and general geologic inventories. Publishes a variety of reports that contain the results of these investigations. Advises the public and government agencies on geologic issues. Maintains a library of geologic bulletins, reports, and periodicals. Maintains a drill-core storage facility at Eagle River.*

Geologic Materials Center
P.O. Box 772805
Eagle river, AK 99577-2805
(907) 696-0079

Division of Land
3601 C St., Ste. 1122, Frontier Bldg.
Anchorage, AK 99503-5947
(907) 762-2692

Function: *Manages surface estate and resources, including materials (gravel, sand, and rock). Handles statewide and regional land-use planning. Issues leases, material-sale contracts, mill-site permits, land-use permits, and easements for temporary use of State land and access roads.*

Northern Regional Office
3700 Airport Way
Fairbanks, AK 99709-4699
(907) 451-2700

Southcentral Regional Office
3601 C St., Ste. 1080, Frontier Bldg.
Anchorage, AK 99503-5937
(907) 762-2253

Southeastern Regional Office
400 Willoughby Ave. 4th Floor
Juneau, AK 99801-1724
(907) 465-3400

Division of Mining & Water Management
3601 C St., Ste. 822, Frontier Bldg.
P.O. Box 107016
Anchorage, AK 99510-7016
(907) 762-2163

A. Mining

Function: *Principal agency for management of mining and reclamation on state land in Alaska. Maintains a mining information office in Fairbanks. Issues property rights to leasable minerals; adjudicates locatable mineral filings. Issues permits for hard-rock and placer-mining activity. Maintains records of mineral locations, permits, and leases. Provides technical, legal, and land-status information. Administers the Alaska Surface Mining Control and Reclamation Act (ASMACRA), which includes permitting and inspection of coal mining activity and reclamation of abandoned mines.*

B. Water Management

Function: *Manages water resources of the state; issues water-appropriation permits and certificates; responsible for safety of all dams in Alaska; conducts surveys to determine the locations, quantity, and quality of ground and surface water.*

Northern Regional Office
3700 Airport Way
Fairbanks, AK 99709-4699
(907) 451-2790 (Mining)
(907) 451-2772 (Water)

Southeastern Regional Office
400 Willoughby, 4th Floor
Juneau, AK 99801
(907) 465-3400

Division of Parks and Outdoor Recreation
3601 C St., Ste. 1200, Frontier Bldg.
Anchorage, AK 99503-5921
(907) 762-2600

Function: *Manages approximately 3,000,000 acres of state park lands primarily for recreational uses, preservation of scenic values, and watershed. Responsible for overseeing mining access, recreational mining activity, and valid mining-claim holdings within state park lands.*

Northern Regional Office
3700 Airport Way
Fairbanks, AK 99709-4699
(907) 451-2695

Southcentral Regional Office
3601 C St., Ste., 1280, Frontier Bldg.
Anchorage, AK 99510-7001
(907) 762-2616

Southeastern Regional Office
400 Willoughby Ave., 4th Fl.
Juneau, AK 99801-1724
(907) 465-4563

History and Archaeology Section
3601 C St., Ste. 1278, Frontier Bldg.
Anchorage, AK 99503-5921
(907) 762-2626

DEPARTMENT OF PUBLIC SAFETY
450 Whittier St.
P.O. Box 111200 (mailing)
Juneau, AK 99811-1200
(907) 465-4322

Division of Fish and Wildlife Protection
5700 East Tudor Rd.
Anchorage, AK 99507-1225
(907) 269-5509

Function: *Enforces state laws, in particular AS Title 16. Acts as enforcement arm for Alaska Department of Fish and Game. Protects Alaska's fish and wildlife resources through enforcement of laws and regulations governing use of natural resources within Alaska. These laws are in Alaska Statutes 08, 16, 46, and Alaska Administrative Code's 05, 12, and 20.*

DEPARTMENT OF REVENUE
State Office Bldg.
11th Fl., Entrance A
P.O. Box 110400 (mailing)
Juneau, AK 99811-0400
(907) 465-2300

Income and Excise Audit Division
State Office Bldg.
11th Fl., Entrance B
P.O. Box 110420 (mailing)
Juneau, AK 99811-0420
(907) 465-2320
(907) 465-2375 (fax)

Function: *Issues licenses for mining, production, and sale of minerals. Administers mining-license tax is based on net income, including royalties. New mining operations—except sand and gravel mining—can apply for and receive certificates of tax exemption for the first 3½ years of operation. Tax returns must be filed annually.)*

UNIVERSITY OF ALASKA
Fairbanks, AK 99775-5780

College of Natural Sciences
Department of Geology & Geophysics
408 Brooks Building
(907) 474-7565

Function: *Provides undergraduate and graduate education in geology*

and geophysics and conducts basic and applied research in geologic sciences. Offers B.S., M.S., and Ph.D. program options in general geology, economic geology, petroleum geology, geophysics, and ice-snow-permafrost geophysics.

School of Mineral Engineering
Duckering Bldg., Rm. 209
(907) 474-7366

Function: *Provides undergraduate and graduate education programs in geological engineering, mining engineering, mineral preparation engineering, and petroleum engineering. Through research programs conducts laboratory and field studies to promote mineral and energy development.*

Mineral Industry Research Laboratory (MIRL)
O'Neill Resources Bldg., Rm. 212B
(907) 474-7135

Function: *Conducts applied and basic research in exploration, development, and utilization of Alaska's mineral and coal resources with emphasis on coal characterization, coal preparation, mineral beneficiation, fine gold recovery, hydrometallurgy, and environmental concerns. Publishes reports on research results and provides general information and assistance to the mineral industry.*

Mining Extension Program
Duckering Bldg., Rm. 401
(907) 474-7702

Function: *Offers prospecting and introductory mineral and mining courses under an open admissions policy.*

Mining and Petroleum Training Service
University of Alaska Anchorage
155 Smithway, Ste. 101
Soldotna, AK 99669
(907) 262-2788

Function: *Provides direct training and assistance to mine operators, service and support companies and governmental agencies in mine safety and health, mining extension, vocational mine training and technical transfer. Specialized training services in hazardous materals, first aid and CPR, industrial hygiene and professional safety education and consulting are available on demand.*

University of Alaska Southeast
Institute of Mining Technology
P.O. Box 22434
Juneau, AK 99802-2434
(907) 463-4840
(907) 465-6864 (fax)

Function: *The IMT is designed to train students for entry-level positions in the mining industry. Students receive their training both in the classroom and at the IMT underground mine training site (the Maggie-Kathleen). Students will also receive their Mine Safety and health Administration (MSHA) certification required by Federal Law. Training sessions last six weeks.*

FEDERAL AGENCIES

U.S. DEPARTMENT OF THE INTERIOR
Office of the Secretary
1689 C St., Ste. 100
Anchorage, AK 99501-5151
(907) 271-5485

Function: *Coordinates the Department of the Interior's policy and stewardship with DOI bureaus for the management of over 200 million acres of public land in Alaska.*

Bureau of Land Management
Alaska State Office
222 West 7th Ave., #13
Anchorage, AK 99513-7599
907) 271-5477
Mineral Law Branch - (907) 271-3343
Public Room - (907) 271-5960

Function: *Administers federal public lands (except national parks, wildlife refuges, national monuments, national forests, and military withdrawals). Issues leases for all federal leasable minerals including oil and gas, coal, phosphates, and oil shale. Arranges for sale of minerals other than leasable or salable materials, including sand, gravel, or stone. Issues right-of-way and special-use permits. Monitors mining operations to insure protection of surface resources. Maintains land-status plats and issues patents. Records federal mining claims and annual assessment affidavits.*

Anchorage District Office
6881 Abbott Loop Rd.
Anchorage, AK 99507-2599
(907) 267-1246
(907) 267-1267 (fax)

Arctic District Office
1150 University Ave.
Fairbanks, AK 99709-3844
(907) 474-2300

Nome Field Office
P.O. Box 925
Nome, AK 99762
(907) 443-2177

Glennallen District Office
P.O. Box 147
Glennallen, AK 99588
(907) 822-3217

Kobuk District Office
1150 University Ave.
Fairbanks, AK 99709-3844
(907) 474-2330

Steese-White Mountain District Office
1150 University Ave.
Fairbanks, AK 99709-3844
(907) 474-2350

Kotzebue Field Office
P.O. Box 1049
Kotzebue, AK 99752
(907) 442-3430
(907) 442-2720 (fax)

Tok Field Office
P.O. Box 309
Tok, AK 99780
(907) 883-5121

Fairbanks Support Center and Land Information Office (Public Room)
1150 University Ave.
Fairbanks, AK 99709-3844
(907) 474-2251

Function: *Primary contact for information on interior and northern regions.*

U.S. Bureau of Mines
Alaska Field Operations Center
3301 C. St., Ste. 525
Anchorage, AK 99503-3935
(907) 271-2455

Function: *Alaska programs are designed to aid development of a viable mineral industry in Alaska with emphasis on field programs focused towards the identification of type, amount and distribution of mineral deposits in Alaska. The field information is augmented by other Bureau programs which provided information on beneficiation technologies (research); economic feasibility studies (potential supply); and economic and environmental effects of mineral development (policy analysis). Information is provided to other government agencies to aid land planning and land use decisions, and to the private sector to identify targets of opportunity for further exploration and/or development.*

Juneau Branch - AFOC
P.O. Box 20550
Juneau, AK 99802-0550
(907) 364-2111

U.S. Fish and Wildlife Service
Region 7 Office
1011 East Tudor Rd.
Anchorage, AK 99503
(907) 786-3542

Function: *Administers the federal public lands in national wildlife refuges, issues special-use permits for activities on refuges, reviews permits and applications for various mining activities on all private and public lands and waters, and provides information to regulatory agencies on fish and wildlife and their habitat. Makes recommendations to regulatory agencies to mitigate adverse environmental impacts.*

Ecological Services Fairbanks
101 12th Ave., Rm. 232
Box No. 19
Fairbanks, AK 99701
(907) 456-0388

U.S. Fish and Wildlife Service
Southeast Alaska Ecological Services
3000 Vintage Blvd., Suite 201
Juneau, AK 99801-7100
(907) 586-7240

Anchorage Ecological Services
605 West 4th Ave., Rm. G-62
Anchorage, AK 99501
(907) 271-2788

U.S. Geological Survey
Geological Division
4200 University Dr.
Anchorage, AK 99508-4663
(907) 786-7403

Function: *Investigates and reports on physical resources; configuration and character of land surface; composition and structure of underlying rocks; and quality, volume, and distribution of water and minerals. Conducts 1:250,000-scale geologic mapping under the auspices of the Alaska Mineral Resource Assessment Program (AMRAP).*

Water Division
4230 University Dr., Suite 201
Anchorage, AK 99508
(907)786-7100

U.S. Geological Survey Earth Science Information Center
National Mapping Division
4230 University Dr., Rm. 101
Anchorage, AK 99508-4664
(907) 786-7011

Function: *Publishes and distributes all available topographic maps of Alaska, digital products, and aerial photography.*

National Park Service
Alaska Regional Office
2525 Gambell St.
Anchorage, AK 99503
(907) 257-2626

Function: *Administers lands within the national park system in Alaska. Manages oil and gas operation and valid prior-right mining claims in parklands through plans of operation under Mining in Parks Act, National Park Service regulations, and other applicable federal and state laws and regulations.*

U.S. DEPARTMENT OF LABOR
Mine Safety and Health Administration
1000 Bucannon Blvd., Suite 4
Boulder City, NV 89005

Juneau Field Station
Federal Building
P.O. Box 22049
Juneau, AK 99802-2049
(907) 586-7165

Function: *Administers health and safety standards to protect the health and safety of metal, nonmetal and coal miners. Cooperates with the State to develop health and safety programs and develops training programs to help prevent mine accidents and occupationally caused diseases. Under agreement with the Coal Mine Safety and Health Office, the MSHA metal/nonmetal section has assumed responsibility for enforcement and training activities at coal mines in Alaska.*

Mine Safety and Health Administration
Coal Mine Safety and Health, District 9
P.O. Box 25367
Denver, CO 80225
(303) 231-5458

Function: *Administers health and safety standards according to the Code of Federal Regulations to protect the health and safety of coal miners; requires that each operator of a coal mine comply with these standards. Cooperates with the State to develop health and safety programs and develops training programs to help prevent coal or other mine accidents and occupationally caused diseases in the industry.*

U.S. DEPARTMENT OF AGRICULTURE
Forest Service
Regional Office
Federal Bldg.
P.O. Box 21628
Juneau, AK 99802-1628
(907) 586-7862

Function: *Provides joint administration of general mining laws on national forest system lands with the Bureau of Land Management. Cooperates with Department of Interior agencies in the review and issuance of mineral leases. Issues permits for disposal of sand, gravel, and stone.*

U.S. ENVIRONMENTAL PROTECTION AGENCY
Region 10 Regional Office
1200 6th Ave.
Seattle, WA 98101
(206) 442-5810

Function: *Issues National Pollutant Discharge Elimination System (NPDES) permits under the Clean Water Act to regulate effluent discharges. Maintains regulatory and review authority over wetland and NEPA/EIS-related issues.*

Alaska Operations Office
222 West 7th Ave., #19
Anchorage, AK 99513-7588
(907) 271-5083

Alaska Operations Office
410 Willoughby Ave., Ste. 100
Juneau, AK 99801
(907) 586-7619

U.S. DEPARTMENT OF THE ARMY
Corps of Engineers
Regulatory Branch
Attention: CENPA-CO-R
P.O. Box 898
Anchorage, AK 99506-0898
Call: Chief of Enforcement Section
(907) 753-2712 or (800) 478-2712
(in Alaska only)

Function: *Regulates work in navigable waters of United States and discharge of dredged or fill material into United States waters, including wetlands. Examples of regulated mining activities include construction of berms, dikes, diversion pads, stockpiles, and reclamation activities.*

COOPERATIVE STATE-FEDERAL AGENCIES

Alaska Public Lands Information Center
250 Cushman St., Ste. 1A
Fairbanks, AK 99701
(907) 456-0527
(907) 456-0514 (fax)
(907)456-0532 (TDD for hearing impaired)

Function: *Clearinghouse for general information on outdoor recreation in Alaska. Information sources include*

U.S. Forest Service, U.S. Fish and Wildlife Service, U.S. Bureau of Land Management, U.S. Geological Survey, National Park Service, Alaska Departments of Natural Resources and Fish and Game, and Alaska Division of Tourism.

BOARDS AND COMMISSIONS

Alaska Minerals Commission
P.O. Box 80148
Fairbanks, AK 99708
(907) 479-6240

Function: *The Mineral Commission was created by the Alaska State Legislature in 1986 to make recommendations to the Governor and the Legislature on ways to mitigate constraints on the development of minerals in Alaska. The Commission has published annual reports since 1987.*

Citizens' Advisory Commission on Federal Areas
3700 Airport Way
Fairbanks, AK 99709
(907)451-2775

Function: *The Citizens' Advisory Commission on Federal Areas was established in 1981 by the Alaska Legislature to protect the rights of Alaskans to continue their traditional uses of federal lands throughout the state. This was done in response to Congressional enactment in December 1980 of the Alaska National Interest Lands Conservation Act (ANILCA), which placed millions of acres of federally owned lands into conservation system units with restrictive land-use and management requirements.*

Alaska Water Resources Board
P.O. Box 107005
Anchorage, AK 99510
(907) 762-2575

Function: *The Alaska Water Resources Board serves as an advisory group to the Governor on all matters relating to use and appropriation of water in the State of Alaska. The board has been particularly supportive of water resources legislation, including amendments to the Alaska Water Use Act for reservations of water and instream uses, basin-wide water rights adjudications, and housekeeping amendments to improve water-rights adjudication. The board has taken a keen interest in the state's water quality programs and water quality standards.*

Alaska Science & Technology Foundation
4500 Diplomacy Dr., Suite 515
Anchorage, AK 99508
(907) 272-4333

Function: *The Foundation was created to make public funds available for long-term investment in economic development and technological innovation within the State and to improve the health status of its residents. Through the awarding of grants for basic and applied research, the Foundation will enhance the State's economy and help build its science and engineering capabilities.*

CHAMBERS OF COMMERCE

Alaska State Chamber of Commerce
217 Second St., Suite 201
Juneau, AK 99801
(907) 586-2323
(907) 463-5515 (fax)

Function: *The State Chamber of Commerce researches and formulates positions on Alaskan resource development. Recommendations for consideration are submitted to the State Chamber of Commerce board of directors.*

Juneau Chamber of Commerce
124 West 5th Ave.
Juneau, AK 99801
(907) 586-6420

Greater Fairbanks Chamber of Commerce
709 2nd Ave.
Fairbanks, AK 99701
(907) 452-1105

Anchorage Chamber of Commerce
441 West 5th Ave., Ste. 300
Anchorage, AK 99501
(907) 272-2401

PUBLIC INTEREST GROUPS AND ASSOCIATIONS

Alaska Miners Association, Inc.
Statewide Office
501 West Northern Lights Blvd., Ste. 203
Anchorage, AK 99503-2565
(907) 276-0347
(907) 278-7997 (fax)

Anchorage Branch
501 West Northern Lights Blvd., Ste. 203
Anchorage, AK 99503-2565
(907) 276-0347

Fairbanks Branch of AMA
P.O. Box 73069
Fairbanks, AK 99707
(907) 451-6650

Juneau Branch of AMA
P.O. Box 21684
Juneau, AK 99802-1684
(907) 586-4704
(907) 463-5712

Kenai Branch of AMA
P.O. Box 242
Sterling, AK 99672
(907) 262-6383

Nome Branch of AMA
P.O. Box 1974
Nome, AK 99762
(907) 443-2632

Alaska Women in Mining
Fairbanks Branch
P.O. Box 83542
Fairbanks, AK 99708
(907) 479-9750

Juneau Branch
P.O. Box 34044
Juneau, AK 99804
(907)586-4161

Anchorage Branch
P.O. Box 240334
Anchorage, AK 99524
(907) 276-6762

Alaskans for Juneau
P.O. Box 22428
Juneau, AK 99802-2428
(907) 463-5065

American Institute of Professional Geologists
7828 Vance Dr., Ste. 103
Arvada, CO 80003
(303) 431-0831

Alaska Section
P.O. Box 92082
Anchorage, AK 99509-2082
(907) 562-3279

Northwest Mining Association
10 North Post St., Ste. 414
Spokane, WA 99201
(509) 624-1158

Placer Miners of Alaska
P.O. Box 81110
Fairbanks, AK 99708
(907) 479-3100

Resource Development Council for Alaska, Inc.
121 W. Fireweed, Suite 250
Anchorage, AK 99503
(907) 276-0700
(907) 276-3887 (fax)

Society for Mining, Metallurgy, and Exploration Inc.
P.O. Box 625002
Littleton, CO 80162-5002
(303) 973-9550

Secretary Treasurer-John Rishel
1505 Atkinson Dr.
Anchorage, AK 99504
(907) 337-0511

Southeast Alaska Conservation Council (SEACC)
419 6th St., Ste. 328
Juneau, AK 99801

Trustees for Alaska
725 Christensen Dr., Ste. 4
Anchorage, AK 99501

ORGANIZED MINING DISTRICTS

Circle Mining District
P.O. Box 80674
Fairbanks, AK 99708
(907) 488-6058

Fairbanks Mining District
105 Dunbar
Fairbanks, AK 99701
(907) 456-7642

Forty-Mile Miners Association
P.O. Box 3885
Palmer, AK 99645
(907) 746-4404

Haines Mining District
P.O. Box 149
Haines, AK 99827
(907) 766-2228

Iditarod Mining District
John A. Miscovich
General Delivery
Flat, AK 99584

Juneau Mining District
P.O. Box 20765
Juneau, AK 99802
(907) 789-4065

Kantishna Mining District
P.O. Box 84608
Fairbanks, AK 99708

Koyukuk Mining District
P.O. Box 9142
Coldfoot, AK 99701

Livengood-Tolovana Mining District
P.O. Box 55698
North Pole, AK 99705
(907) 488-6453

Valdez Creek Mining District
P.O. Box 875534
Wasilla, AK 99687-5534

Yentna Mining District
13004 NE 9th Ave.
Vancouver, WA 98685

MINERAL EDUCATION PROGRAMS

ALASKA MINERAL AND ENERGY RESOURCE EDUCATION FUND (AMEREF)
c/o RDC
121 W. Fireweed Lane, Suite 250
Anchorage, AK 99503
(907) 276-0070
(907) 276-3887 (fax)

Function: *A nonprofit corporation formed to help prepare students in grades K-12 to make informed decisions about Alaska's mineral and energy resources.*

Alaska Department of Education
801 W. 10th St., Ste. 200
Juneau, AK 99801-1894
(907) 465-8719

NATIVE REGIONAL CORPORATIONS

AHTNA INCORPORATED
Main Office
P.O. Box 649
Glennallen, AK 99588-0649
(907) 822-3476
(907) 822-3495 (fax)

Anchorage Office
406 Fireweed Lane, Ste. 203
Anchorage, AK 99503
(907) 274-7662
(907) 274-6614 (fax)

THE ALEUT CORPORATION
4000 Old Seward Hwy, #300
Anchorage, AK 99503-6087
(907) 561-4300
(907) 563-4328 (fax)

ARCTIC SLOPE REGIONAL CORPORATION
P.O. Box 129
Barrow, AK 99723-0129
(907) 852-8633
(907) 852-8533
(907) 852-5733 (fax)

Anchorage Office
301 Danner Ave., Suite 300
Anchorage, AK 99518-3035
(907) 349-2369
(907) 349-5476 (fax)

BERING STRAITS NATIVE CORPORATION
P.O. Box 1008
Nome, AK 99762-1008
(907) 443-5252
(907) 443-2985 (fax)

BRISTOL BAY NATIVE CORPORATION
800 Cordova Street
P.O. Box 100220 (mailing)
Anchorage, AK 99510-0220
(907) 278-3602
(907) 276-3924 (fax)

CALISTA CORPORATION
601 W. 5th Ave., Suite 200
Anchorage, AK 99501-2225
(907) 279-5516
(907) 272-5060 (fax)

CHUGACH ALASKA CORPORATION
560 E. 34th Ave., Ste. 200
Anchorage, AK 99503-4196
(907) 563-8866
(907) 563-8402 (fax)

COOK INLET REGION INC.
and its subsidary North Pacific Mining Corporation
P.O. Box 93330
Anchorage, AK 99509-3330
(907) 274-8638
(907) 279-8836 (fax)

DOYON LTD.
201 1st Ave., Suite 300
Fairbanks, AK 99701
(907) 452-4755
(907) 456-6785 (fax)

KONIAG INCORPORATED
4300 B St., Suite 407
Anchorage, AK 99503
(907) 561-2668
(907) 562-5258 (fax)

NANA REGIONAL CORPORATION
P.O. Box 49
Kotzebue, AK 99752
(907) 442-3301
(907) 442-2866 (fax)

Anchorage Office
1001 E. Benson Blvd.
Anchorage, AK 99508
(907) 265-4100
(907) 265-4123 (fax)

SEALASKA CORPORATION
One Sealaska Plaza, Ste. 400
Juneau, AK 99801
(907) 586-1512
(907) 586-2304 (fax)

APPENDIX D
Selected significant mineral deposits and mineral districts in Alaska[a]

The alphabetized list of mineral deposits and mineral districts is keyed to the list of explanatory paragraphs that follow. For example, The Lik deposit in the alphabetized list is "**Lik,** 1, (fig. D-1)." This says that the location of Lik is shown as number 1 in figure D-1.

Alaska-Juneau, 100, (fig. D-3).
Anderson Mountain, 54, (fig. D-1).
Aniak - Nyac mining district, 84, (fig. D-3).
Apex-El Nido, 104, (fig. D-3).
Apollo-Sitka mines, 86, (fig. D-3).
Arctic, 9, (fig. D-1).
Avan Hills, 12, (fig. D-3).
Baultoff ,75, (fig. D-2).
Bear Mountain, 21, (fig. D-2).
Big Creek/Ladue, 58, (fig. D-1).
Big Hurrah, 32, (fig. D-3).
Binocular and other prospects, 72, (fig. D-1).
Bohemia Basin, 103, (fig. D-3).
Bokan Mountain, 122, (fig. D-3).
Bonanza Creek, 45, (fig. D-2).
Bond Creek, 73, (fig. D-2).
Bonnifield district massive sulfide deposits, 54, (fig. D-1).
Bornite, 8, (fig. D-1).
Brady Glacier, 98, (fig. D-3).
BT, 54, (fig. D-1).
Buck Creek, 23, (fig. D-2).
Candle Creek, 39, (fig. D-3).
Candle district, 39 (fig. D-3)
Cape Creek, 22, (fig. D-2).
Carl Creek, 74, (fig. D-2).
Casca VABM, 53, (fig. D-1).
Castle Island, 111, (fig. D-1).
Chandalar mining district, 17, (fig. D-3).
Chichagof, 101, (fig. D-3).
Chistochina, 68, (fig. D-3).
Circle mining district, 52, (fig. D-3).
Claim Point, 82, (fig. D-3).
Coal Creek, 63, (fig. D-2).
Copper City, 119, (fig. D-1).
Cornwallis Peninsula, 110, (fig. D-1).
Delta massive sulfide belt, 55, (fig. D-1).
Denali prospect, 67, (fig. D-1).
Drenchwater, 3, (fig. D-1).
Dry Creek, 54, (fig. D-1).
Ear Mountain, 25, (fig. D-2).
Ellamar, 78, (fig. D-1).
Ernie Lake, (Ann Creek),15, (fig. D-1).
Esotuk Glacier, 20, (fig. D-2).
Fairbanks mining district, 49 a-c, (fig. D-3).
Fort Knox, 49a, (fig. D-3).
Fortymile mining district, 60, (fig. D-3).
Frost, 7a, (fig. D-1).
Funter Bay mining district, 99, (fig. D-3).
Galena Creek, 21a, (fig. D-1).
Ginny Creek, 4, (fig. D-1).
Golden Zone mine, 64, (figs. D-1 and D-2).
Goodnews Bay, 85, (fig. D-3).
Grant Mine, 49c, (fig. D-3).
Greens Creek, 105, (fig. D-1).
Groundhog Basin, 112, (fig. D-1).
Haines Barite, 95, (fig. D-1).
Hannum, 27, (fig. D-1).
Hirst Chichagof, 101, (fig. D-3).
Horsfeld, 76, (fig. D-2).
Hot Springs mining district, 47, (fig. D-3).
Hyder mining district, 117, (figs. D-1 and D-2).
Iditarod district, 43a, (fig. D-3).
Illinois Creek, 44a, (fig. D-1).
Independence, 79, (fig. D-3).
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[a]This generalized summary does not describe all of the known 6,400 mineral deposits in Alaska.

NOTE: In cooperation with DGGS and the Russian Academy of Sciences, the USGS recently released Open-File Report 93-339 (Nokleberg and others, 1993), *Metallogenesis of mainland Alaska and the Russian northeast,* which describes 273 lode deposits and 43 significant placer districts in Alaska.

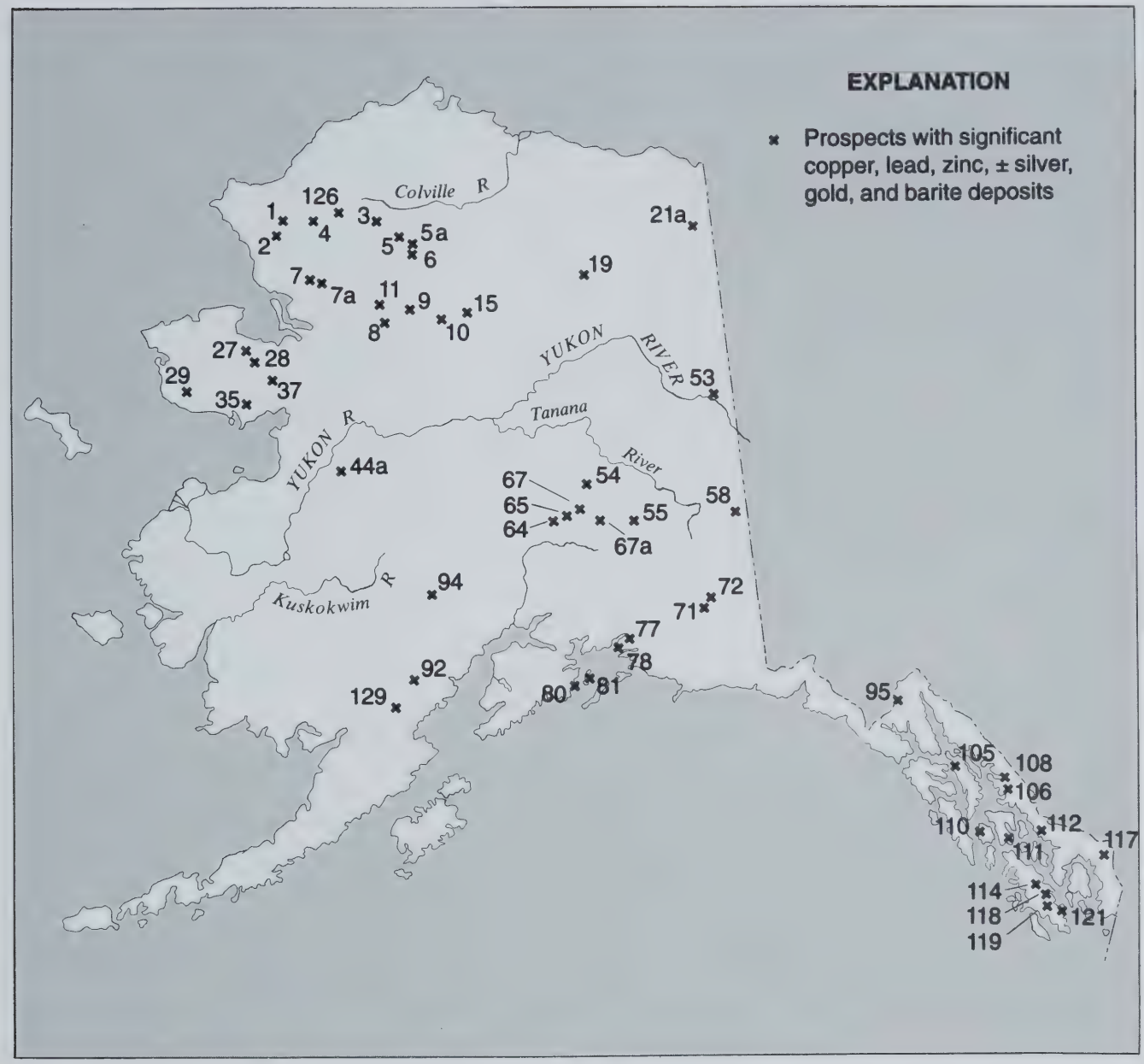


Figure D-1. *Significant copper, lead, zinc with credits of silver, gold, and barite deposits in Alaska, 1994.*

Map no.

1 **Lik** - Major strata-bound massive sulfide (Zn-Pb-Ag-Ba) deposit in black shale and chert. Proven reserve (Lik) estimate of 21.77 million tonnes (24 million tons) of 9% Zn, 3.1% Pb, and 48 g/tonne (1.4 oz/ton) Ag (fig. D-1).

2 **Red Dog** - At least two major strata-bound massive sulfide deposits hosted in Pennsylvanian or Mississippian shale; similar to locality 1. The main deposit at Red Dog contains 54.3 million tonnes (59.9 million tons) of measured and indicated ore grading 18.3% Zn, 5.5% Pb, with 93 g/tonne (2.71 oz/ton) Ag. The additional inferred reserve is 14.1 million tonnes (15.55 million tons) grading 10.0% Zn, 2.7% Pb, and 41 g/tonne (1.2 oz/ton) Ag. (fig. D-1).

3 **Drenchwater** - Mississippian and Pennsylvanian shales and cherts contain three strata-bound base metal occurrences spatially related to acid volcanics. In the lowest unit, a siliceous mudstone, contains a 0.6 m (2-ft) layer with up to 23% Zn. An overlying gray chert contains up to 11% Zn and up to 5% Pb with some Ag in fracture fillings. At the top of the overlying tuffaceous layer, Ag-bearing Zn and Pb mineralization outcrops discontinuously for at least 1,982 m (6,500 ft), and contains up to 26% Zn and 51% Pb in grab samples (fig. D-1).

4 **Ginny Creek** - Epigenetic, disseminated Zn-Pb-Ag deposits with barite in sandstone and shale of Noatak Sandstone of Late

Figure D-2. *Significant molybdenum-copper and tin-tungsten with credits of fluorite and beryllium deposits in Alaska, 1994.*

Devonian through Early Mississippian age. Random grab samples of surface float contain 0.3% to 3.0% Zn and highly variable amounts of Pb and Ag (fig. D-1).

5 **Story Creek** - Epigenetic replacement deposits of Zn-Pb-Ag-Cu-Au hosted in brecciated zones in Devonian Kanayut Conglomerate or Lower Mississippian Kayak Shale. Grab samples of high-grade material contain up to 0.43% Cu, 34% Pb, 28.8% Zn, 1.4 g/tonne (0.04 oz/ton) Au, and 1,028 g/tonne (30 oz/ton) Ag (fig. D-1).

5a **Kivliktort Mountain** - Mineralized float is widespread on the north flanks of the mountain, apparently spatially related to the contact between shales at the base of the hills and coarse-grained siliceous clastic rocks on the upper slopes. Rock samples containing up to 30% Zn have been reported (fig. D-1).

6 **Whoopee Creek** - Epigenetic replacement deposits of Zn-Pb-Cu-Ag-Au-Cd in breccia zones in Devonian Kanayut Conglomerate or Lower Mississippian Kayak Shale. Random grab samples of mineralized material contain 0.24% Cu, 0.37% Cd, 46% Zn, 44% Pb, 4.8 g/tonne (0.14 oz/ton) Au, and 507 g/tonne (14.8 oz/ton) Ag (fig. D-1).

7 **Omar** - Epigenetic replacement deposits of Paleozoic age; include bedded barite occurrences. Grab samples contain 15.3% Cu, 0.15% Pb, 0.95% Zn, 0.05% Co, and 10 g/tonne (0.3 oz/ton) Ag (fig. D-1).

7a **Frost** - Possible 8.2 million tonnes (9 million tons) barite in pods, lenses, and wavey-banded quartz-catcite-barite veins. Chalcopyrite and galena occur in the veins which cross cut Paleozoic limestone and dolomite for a minimum distance of 1.6 km (1 mi). Selected samples contain up to 13.2% Zn (fig. D-1).

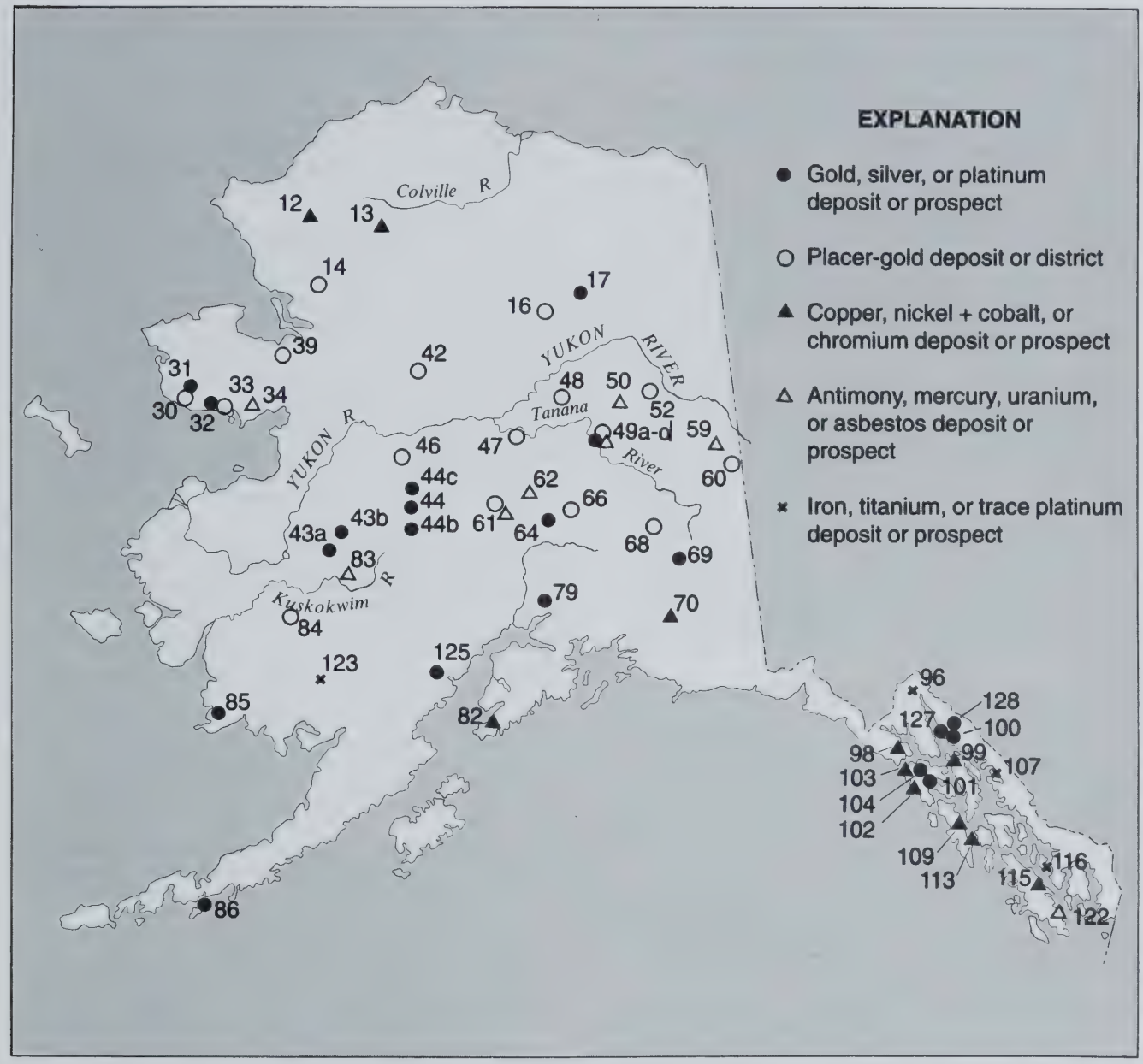


Figure D-3. *Significant gold, silver, platinum, and strategic mineral deposits in Alaska, 1994.*

8 **Bornite** - Major strata-bound Cu-Zn deposit in brecciated carbonate rock of Devonian age; 4.56 million tonnes (5.0 million ton) orebody contains 4.0% Cu and accessory Zn and Co. Larger reserve estimate of 36.2 million tonnes (40 million tons) of about 2% Cu and undisclosed amount of Zn and Co. At grade of 1.2% Cu, reserves are 91 million tonnes (100 million tons) (fig. D-1).

9 **Arctic** - Major volcanogenic (Cu-Zn) massive sulfide deposit hosted in sequence of metarhyolite, metatuff, and graphitic schist of Devonian age; indicated reserves of 36.3 million tonnes (40 million tons) grade 4.0% Cu, 5.5% Zn, 0.8% Pb, 55 g/tonne (1.6 oz/ton) Ag, and 0.69 g/tonne (0.02 oz/ton) Au (fig. D-1).

10 **Sun** - Major (Cu-Pb-Zn-Ag) massive sulfide deposit in sequence of middle Paleozoic metarhyolite and metabasalt. Average grades are 1 to 4% Pb, 6 to 12% Zn, 0.5 to 7% Cu, 103 to 377 g/tonne (3 to 11 oz/ton) Ag (fig. D-1).

11 **Smucker** - Middle Paleozoic volcanogenic massive sulfide deposit; 915 m (3,000 ft) long and up to 58 m (190 ft) wide contains significant tonnage of Cu-Pb-Zn ore that grades 1.5% Pb, 5 to 10% Zn, 103 to 343 g/tonne (3 to 10 oz/ton) Ag, with minor Au (fig. D-1).

12 **Avan Hills** - Disseminated chromite in layered ultramafic rocks; grab samples contain up to 4.3% Cr with 0.51 g/tonne (0.015 oz/ton) PGM (fig. D-3).

13 **Misheguk Mountain** - Chromite occurrences similar to those in Avan Hills (fig. D-3).

14 **Klery Creek** - Lode and placer Au deposits worked intermittently from 1909 through 1930s. Total production through 1931, mostly from placer deposits, estimated at 974 kg (31,320 oz) Au (fig. D-3).

15 **Ernie Lake** - (Ann Creek) Strata-bound massive sulfide occurrence in metarhyolite, metatuff, and marble. Gossan zones strongly anomalous in Cu-Pb-Zn and Ag (fig. D-1).

16 **Koyukuk-Nolan mining district** - Major placer Au district; from 1893 to 1993, produced an estimated 10,101 kg (324,804 oz) Au. Significant deep placer reserves remain (fig. D-3).

17 **Chandalar mining district** - Major Au producing district; substantial production in excess of 1,964kg (63,158 oz) Au through 1993 from lode and placer sources; lode Au found in crosscutting quartz veins that intrude schist and greenstone. Active development of placer deposits and lodes in progress. Inferred lode reserves estimated to be 40,800 tonnes (45,000 tons) with grade of 69 g/tonne (2 oz/ton) Au (fig. D-3).

18 **Porcupine Lake** - Stratiform fluorite occurrences and argentiferous enargite, tetrahedrite associated with felsic volcanic rocks of late Paleozoic age. Reported grades of up to 25% to 30% fluorite (CaF_2) reported, with grab samples of 4.8% Cu (fig. D-2).

19 **Wind River** - Strata-bound Pb-Zn massive sulfide prospects; reported grades of up to 5% Pb (fig. D-1).

20 **Esotuk Glacier** - Disseminated Mo-Sn-W-Pb-Zn mineralization in skarns associated with Devonian(?) schistose quartz monzonite. Grab samples contain up to 0.08% Sn and 0.15% W (fig. D-2).

21 **Bear Mountain** - Major stockwork Mo-W-Sn occurrence in intrusive breccia. Rock samples containing up to 0.8% Mo and 0.6% W occur within a 14 ha (35 acre) area where soil samples average more than 0.2% MoS_2, and an adjacent 10 ha (25 acre) area where rubble contains wolframite has soils averaging greater than 0.12% WO_3. Rubble crop in this area indicates a Tertiary porphyry system as the source of the Mo and W (fig. D-2).

21a **Galena Creek** - Steeply dipping veins contain up to 21% Cu, 3.5% Zn, and 1.3% Pb with 189 g/tonne (5.5 oz/ton) Ag on the east side of the creek, and a large area of disseminated mineralization and veinlets contains predominantly Zn on the ridge west of the creek (fig. D-1).

22 **Cape Creek** - Major placer Sn producer. More than 454 tonnes (500 tons) Sn produced from 1935 to 1941; from 1979 to 1990, produced 940 tonnes (1,040 tons) Sn. Derived from Cape Mountain in contact zone of Cretaceous granite and limestone (fig. D-2).

23 **Buck Creek** - Major placer Sn producer. More than 998 tonnes (1,100 tons) Sn produced from 1902 to 1953 (fig. D-2).

24 **Lost River** - Major Sn, fluorite, W, and Be deposit associated with Cretaceous Sn granite system. More than 317 tonnes (350 tons) Sn produced from skarn and greisen lode sources. Measured reserves amount to 22.3 million tonnes (24.6 million tons) that grade 0.15% Sn, 16.3% CaF_2, and 0.03% WO_3, based on 13,720 m (45,000 ft) of diamond drilling (fig. D-2).

25 **Ear Mountain** - Placer Sn district and Sn-Cu-Au-Ag-Pb-Zn skarn mineralization of Cretaceous age. Area also anomalous in U (fig. D-2).

26 **Kougarok Mountain** - Sn deposit hosted in quartz-tourmaline-topaz greisen of Cretaceous age. Grades may average 0.5% Sn and 0.01% Ta and Nb, but a high grade resource of 136,050 tonnes (150,000 tons) grading 1% + Sn has been identified, with incrementally higher tonnage at lower grades (fig. D-2).

27 **Hannum** - Stratiform, carbonate-hosted Pb-Zn-Ag massive sulfide deposit of mid-Paleozoic age in heavily oxidized zone that ranges from 9 to 46 m (30 to 150 ft) thick. Mineralized zone reported to assay up to 10% Pb, 2.2% Zn, 1.4 g/tonne (0.04 oz/ton) Au, and 60.3 g/tonne (1.76 oz/ton) Ag (fig. D-1).

28 **Independence Creek** - Pb-Zn-Ag massive sulfide deposit; high-grade ore shipped in 1921 contained 30% Pb, 5% Zn, up to 5,141 g/tonne (150 oz/ton) Ag. Mineralization restricted to shear zone in carbonates (fig. D-1).

29 **Sinuk River region**- Several Pb-Zn-Ag-Ba-F bearing massive sulfide deposits and layered Fe deposits in carbonate and metavolcanic rocks of Nome Group. Mineralized zones extend for over 2,440 m (8,000 ft) along strike (fig. D-1).

30 **Nome mining district** - Major placer Au producer. Production from 1897-1993 in excess of 149,982 kg (4,822,569oz) Au all from placers. Sporadic Sb and W production in past (fig. D-3).

31 **Rock Creek** - About 6.6 million tons grading 2.5 g/tonne (0.072 oz/ton) Au in vein swarms and stringers in an area 457 m (1,500 ft) long, 152 m (500 ft) maximum width and 91 m (300 ft) deep (fig. D-3).

32 **Big Hurrah** - Epigenetic vein deposit in black slate and metasedimentary rocks of the Soloman schist. Deposit contains some W mineralization and has produced over 840 kg (27,000 oz) Au from nearly 45,350 tonnes (50,000 tons) milled ore. Proven, inferred, and indicated reserves total 94,328 tonnes (104,000 tons) that grade 21 g/tonne (0.61 oz/ton) Au, 19 g/tonne (0.55 oz/ton) Ag, and credits of WO_3 (fig. D-3).

33 **Solomon mining district** - Major placer Au district; produced over 12,472 kg (401,030 oz) through 1993.. Three structurally controlled Au deposits in Bluff area—Daniels Creek, Saddle, and Koyana Creek—contain minimum inferred reserves of 5.9 million tonnes (6.5 million tons) grading 3.4 g/tonne (0.1 oz/ton) Au (fig. D-3).

34 **Kachauik** - U prospect in Cretaceous alkalic intrusive rocks. Highly anomalous geochemical values and U concentrations of 1,000 ppm reported (fig. D-3).

35 **Omalik** - Vein-type Pb-Zn-Ag massive sulfide prospect in Paleozoic carbonate rocks; from 1881 to 1900, produced 363 tonnes (400 tons) of Pb-Zn ore that averaged about 10% Pb and 1,371 g/tonne (40 oz/ton) Ag. Grades of oxidized Zn ore reported to be up to 34% Zn (fig. D-1).

36 **Windy Creek** - Disseminated Mo-Pb-Zn mineralization in quartz veins and skarns with reported values as high as 0.15% Mo (fig. D-2).

37 **Quartz Creek** - Significant Pb-Zn-Ag mineralization; reported grades of 15% combined Pb-Zn and 343 g/tonne (10 oz/ton) Ag (fig. D-1).

38 **Placer River** - Significant Mo-F mineralization disseminated in intrusive rocks. Reported values of 0.2% Mo (fig. D-2).

39 **Candle/Inmachuk district** - Placer deposits with 7,717 kg (248,130 oz) production from 1902-1993; significant reserves

remaining in a large ancestral channel system. Large base metal sulfide concentrations and U values in concentrates (fig. D-3).

40 **Poovookpuk Mountain** - Porphyry Mo mineralization. Reported grades of up to 0.25% Mo (fig. D-2).

41 **Purcell Mountain** - Mo and Ag occurrences associated with Cretaceous alkalic igneous plutons, alaskite, and bostonite dikes (fig. D-2).

42 **Koyukuk-Hughes mining district** - Production of 7,084 kg (227,788 oz) Au from 1930 to 1993, mainly from Alaska Gold Company dredge at Hogatza; dredge reactivated in 1981, but deactivated in 1984, and reactivated again in 1990. Nonfloat mechanized operation on Utopia Creek produced significant amount of placer Au from 1930 to 1962 (fig. D-3).

43a **Iditarod district** - Major placer Au district; produced 48,492 kg (1,559,260 oz) Au through 1993. Significant reserves of lode-Au and lode-W at Golden Horn deposit Chicken Mountain, and other known lodes in region associated with shear zones and monzonite intrusive rocks of Late Cretaceous age (fig. D-3).

43b **Innoko-Tolstoi mining district** - Major placer Au district with significant lode Au-Sb-Hg potential; lode sources for placers are volcanic-plutonic complexes of Late Cretaceous and dike swarms that intrude Mesozoic flysch; mining district produced 18,296 kg (588,302 oz) Au through 1993 almost all from placer deposits. New discovery on Vinasale Mountain south of McGrath is Au-polymetallic deposit in monzonite stock (fig. D-3).

44 **Nixon Fork** - Promising Au-Cu deposits; Nixon Fork mine produced 1,851 kg (59,500 oz) Au from Late Cretaceous skarns associated with quartz monzonite-Devonian limestone contact zones. Indicated reserve of about 10,886 kg (350,000 oz) Au in 258,500 tonnes (285,000 tons) of ore (fig. D-3).

44a **Illinois Creek** - Near-surface geologic resource is 5.76 million tonnes (6.35 million tons) at 2.4 g/tonne (0.070 oz/ton) gold and 51.47 g/tonne (1.5 oz/ton) silver (fig. D-1).

44b **Vinasale Mountain** - Intrusive hosted gold deposit. Au mineralization is associated with arsenopyrite and pyrite and within zones of phyllic and silicic alteration hosted within a 69 Ma quartz monzonite stock. Both disseminated an veinlet mineralization exist. A geologic resource of 14,351,000 tons with an average grade of 0.067 opt Au was identified in 1991(fig. D-3).

44c **Von Frank Mountain** - Gold and very weak copper mineralization are associated with chalcopyrite, pyrite, and rare molybdenite within a zone of quartz stockwork veining hosted in a 69 Ma quartz-diorite stock. The stock is a cupola of the larger Von Frank Pluton. Drill intercepts include thicknesses up to 429 feet with an average grade of 0.013 opt Au. Higher grade intercepts include 0.035 opt Au up to 135 ft. (fig. D-3).

45 **Bonanza Creek** - Skarn-type W mineralization along intrusive contact; no published information available (fig. D-2).

46 **Ruby mining district** - Placer Au-Sn district; produced more than 14,611 kg (469,795 oz) Au from 1931 to 1993; mining district also contains Pb-Ag prospects with grades reportedly as high as 2,811 g/tonne (82 oz/ton) Ag (fig. D-3).

47 **Hot Springs mining district** - Placer Au-Sn district; produced more than 17,432 kg (560,532 oz) Au and over 326,590 kg (720,000 lb) cassiterite through 1993. Includes Eureka and Tofty subdistricts (fig. D-3).

48 **Livengood-Tolovana mining district** - Placer Au district; produced more than 14,928 kg (480,013 oz) Au since discovery in 1914 to 1993. Substantial reserves remain mainly on Livengood Bench, a Pliocene ancestral channel (fig. D-3).

49 **Fairbanks mining district** - Nationally ranked Au-producing district; largest producer in Alaska. Produced about 247,899 kg (7,971,028 oz) Au from placer deposits. Major lode-Au and lode-Sb producer; produced more than 9,472 kg (304,548 oz) Au and over 1.8 million kg (4 million lb) Sb from veins and shear zones through 1990. Production of W exceeded 4,000 STU since 1915, all derived from skarn near Cretaceous quartz monzonite.

49a **Fort Knox** - Disseminated Au deposit within granodiorite/quartz monzonite pluton near Fairbanks. Proven and probable reserves, open at depth, are 128,000 kg (4,117,000 oz) of gold in 158.3 million tonnes (174.5 million tons) of rock (fig. D-3).

49b **Ryan lode** - Based on a 0.51 g/tonne (0.015 oz/ton) cutoff, total reserves in the metasediment-hosted Ryan Lode and subparallel igneous-hosted Curlew Shear are 25,573 kg (822,200 oz) of gold in 13.2 million tonnes (14.6 million tons) of rock. A geologic resource of about 74,468 kg (2.4 million oz) occurs within the total shear zone system (fig. D-3).

49c **Grant Mine** - A series of subparallel Au-bearing quartz veins in the schist and quartzite of Ester Dome. Indicated reserves, 1990, on one vein system, the O'Dea, are 192,285 tonnes (212,000 tons) of 12 g/tonne (0.36 oz/ton) Au. Other similar vein systems have been identified within the property (fig. D-3).

49d **True North** - Au occurs in siderite-quartz veins in carbonaceous quartzite and schist within a terrane containing eclogitic rocks. The proven and probable mineable reserve is 6.24 million tonnes (6.87 million tons) grading 2.23 g/tonne Ag (0.065 oz/ton) for a contained 13,872 kg (446,000 oz) Au. Further exploration is expected to increase the reserve base (fig. D-3).

50 **Mt. Prindle** - Significant U-rare-earth mineralization in Mesozoic alkaline igneous rocks. Rock geochemical values of up to 0.7% U; up to 15% rare-earth elements reported (fig. D-3).

51 **Twin Mountain** - Significant W mineralization associated with skarn development along contact zone of quartz monzonite stock of Cretaceous age (fig. D-2).

52 **Circle mining district** - Currently one of Alaska's largest producing placer-Au district; produced 31,717 kg (1,019,843 oz) Au since discovery in 1893 to 1993. Has significant potential for Sn, W, and Au mineralization from variety of lode sources (fig. D-3).

53 **Three Castle Mountain, Pleasant Creek, Casca VABM** - Strata-bound Pb-Zn massive sulfide mineralization. Reported grades of up to 17% Zn and 2% Pb (fig. D-1).

54 **Bonnifield district massive sulfide deposits (Anderson Mountain, Dry Creek, Sheep Creek, Virginia Creek, BT, Liberty Belle)** - Significant volcanogenic Cu-Pb-Zn-Ag massive sulfide deposits of Devonian to Mississippian age in Bonnifield mining district. Potential for high-grade deposits

reported. Includes Liberty Bell strata-bound Au-B deposit and mineralization in Sheep Creek; latter contains Sn as well as base metals (fig. D-1).

55 **Delta massive sulfide belt** - Contains at least 30 known volcanogenic massive sulfide deposits and occurrences. Grades from 0.3% to 1.1% Cu, 1.7% to 5.7% Zn, 0.5% to 2.3% Pb, 24 to 69 g/tonne (0.7 to 2.0 oz/ton) Ag, and 0.61 to 2.1 g/tonne (0.018 to 0.061 oz/ton) Au; estimated potential reserve of 34.6 million tonnes (40 million tons) for all deposits (fig. D-1).

56 **Mosquito, Peternie** - Porphyry Mo prospects of early Tertiary age; reported grades of up to 0.17% Mo (fig. D-2).

57 **Taurus** - Significant major porphyry Cu-Au prospect of Paleocene age. East Taurus Zone contains inferred reserves of 126 million tonnes (140 million tons) grading about 0.30% Cu and .34 g/tonne (0.01 oz/ton) Au, and 0.03% Mo (fig. D-2).

58 **Big Creek, Ladue** - Strata-bound Pb-Zn-Ag massive sulfide prospects in metavolcanic rocks (fig. D-1).

59 **Slate Creek** - At least 50 million tonnes (55 million tons) of 6.3%, high-quality chrysotile asbestos in serpentinized ultramafic rocks of Permian(?) age (fig. D-3).

60 **Fortymile mining district** - Major placer Au district. Produced over 16,491 kg (530,265 oz) placer and very minor lode Au since discovery in 1886 to 1993 (fig. D-3).

61 **Kantishna mining district** - Major placer Au and lode Ag-Au-Pb-Zn-Sb-W district. Produced 3,089 kg (99,307 oz) placer and lode-Au, about 9,549 kg (307,000 oz) lode Ag, and 2.3 million kg (5million lb) Sb from shear zones and vein deposits hosted in metamorphic units of Yukon-Tanana terrane. Nearly 90 lode deposits have been identified; potential exists for significant Ag-Au-Pb-Zn resources. Metalliferous strata-bound base metal deposits occur in schist and quartzite (fig. D-3).

62 **Stampede mine** - Major Sb deposit; produced more than 1.42 million kg (3.5 million lb) Sb from large shear zone in polymetamorphic rocks of Yukon-Tanana terrane (fig. D-3).

63 **Coal Creek** - Greisen-hosted Sn-Cu-W deposit in "McKinley" age pluton (55 million-year-old). Reported reserves of 4.54 million tonnes (5 million tons) of ore that grade 0.28% Sn and 0.3% Cu with credits of W, Ag, and Zn (fig. D-2).

64 **Golden Zone mine** - Major Au-Cu-Ag deposits in Late Cretaceous breccia pipe. Produced more than 49 kg (1,581 oz) Au, 268 kg (8,617 oz) Ag, and 19,051 kg (42,000 lb) Cu. Estimated reserves are 7,153 kg (230,000 oz) of Au in about 1.8 million tonnes (2 million tons) ore (figs. D-1 and D-3).

65 **Nim Prospect** - Porphyry Cu-Ag-Au deposit of Late Cretaceous age. Reported grades of up to 5.0% Cu and 309 g/tonne (9 oz/ton) Ag (fig. D-1).

66 **Valdez Creek district** - About 13,307 kg (427,875 oz) Au production through 1993. Cambior Alaska Inc., the largest placer mine in Alaska, operates in this district (fig. D-3).

67 **Denali Prospect** - At least six small, strata-bound Cu lodes in volcanic sedimentary rocks of Triassic age that may contain 4.54 million tonnes (5 million tons) ore that grade about 2% Cu with credits of Ag (fig. D-1).

67a **Zackly** - Disseminated copper and gold in a garnet-pyroxene skarn and marble. Reserves are estimated as 1.27 million tonnes (1.4 million tons) grading 2.6 percent Cu and 6.0 g/ton (0.175 oz/ton) Au (fig. D-1).

68 **Chistochina** - Porphyry Cu prospects of Tertiary age and placer-Au district; produced more than 5,637 kg (181,261 oz) Au and small amount Pt from placer deposits (fig. D-3).

69 **Nabesna mine** - Classic high-grade Au skarn that envelopes quartz diorite of Jurassic(?) age; produced over 2,068 kg (66,500 oz) Au from about 79,816 tonnes (88,000 tons) of ore from 1930 to 1941 (fig. D-3).

70 **Spirit Mountain** - Massive and disseminated Cu-Ni mineralization in mafic-ultramafic complex (fig. D-3).

71 **Kennecott deposits** - Major stratiform Cu-Ag massive sulfide deposits localized near contact between Chitistone Limestone and Nikolai Greenstone of Triassic age; contained some of highest grade Cu lodes mined in North America. From 1911 to 1938, produced more than 544 million kg (1.2 billion lb) Cu and 311,028 kg (10 million oz) Ag from 4.35 million tonnes (4.8 million tons) ore. Some reserves remain (fig. D-1).

72 **Binocular and other prospects** - Kennecott-type Cu-Ag massive sulfide deposits (fig. D-1).

73 **Bond Creek - Orange Hill** - Two major porphyry Cu-Mo deposits of Late Cretaceous age; reported inferred reserves of 770 million tonnes (850 million tons) ore that grade 0.3 to 0.5% Cu and 0.03% Mo (fig. D-2).

74 **Carl Creek** - Porphyry Cu prospect in altered intrusive complex; similar to locality 73 (fig. D-2).

75 **Baultoff** - Porphyry Cu prospect in altered intrusive rocks; inferred reserves of 132 million tonnes (145 million tons) of 0.20% Cu similar to locality 73 (fig. D-2).

76 **Horsfeld** - Porphyry Cu prospect; similar to locality 73 (fig. D-2).

77 **Midas mine** - Significant strata-bound Cu (Ag-Au-Pb-Zn) massive sulfide deposit in volcanic sedimentary rocks of Tertiary Orca Group. Produced more than 1.5 million kg (3.3 million lb) Cu from 44,760 tonnes (49,350 tons) ore (fig. D-1).

78 **Ellamar** - Strata-bound Cu-Zn-Au massive sulfide deposit in sediment of Eocene(?) Orca Group. Produced more than 7.3million kg (16 million lb) Cu, 1,596 kg (51,307 oz) Au, and 5,960 kg (191,615 oz) Ag from about 273,764 tonnes (301,835 tons) ore (fig. D-1).

79 **Willow Creek, Independence, Lucky Shot, War Baby** - Major lode-Au (Ag-Cu-Pb-Zn-Mo) in veins that cut Mesozoic quartz diorite. Produced more than 18,860 kg (606,400 oz) Au from lode sources and about 1,729 kg (55,600 oz) Au from associated placer deposits (fig. D-3).

80 **Latouche, Beatson** - Major strata-bound Cu-Zn-Ag massive sulfide deposits in Orca Group sedimentary rocks and mafic volcanic rocks. Produced more than 93 milion kg (205 million lb) Cu from 5.4 million tonnes (6 million tons) ore. Inferred reserves of 4.53 million tonnes (5 million tons) ore that grade 1% Cu, 1.5% Pb+Zn (fig. D-1).

81 **Rua Cove** - Major strata-bound Cu-Zn massive sulfide deposit in complex ore shoots enclosed in mafic volcanic rocks of Orca Group. Reported reserves of over 1 million tonnes (1.1 million tons) ore that grade 1.25% Cu (fig. D-1).

82 **Red Mountain and Claim Point** - Significant Cr occurrence associated with layered ultramafic complexes of Tertiary age at Red Mountain near Seldovia. More than 35,419 tonnes (39,951 tons) metallurgical-grade ore shipped through 1976; huge low-grade Cr resource may remain, of which 27 million tonnes (30 million tons) grade 5.1% Cr_2O_3 (fig. D-3).

83 **Red Devil** - Major Hg-Sb deposit; high-grade epithermal Hg-Sb deposit hosted in shear zones in Kuskokwim Group sedimentary rocks. More than 1.24 million kg (35,000 flasks) Hg produced from 68,025 tonnes (75,000 tons) ore (fig. D-3).

84 **Aniak/Nyac mining district** - Significant placer Au district. Aniak mining district produced 16,442 kg (528,670 oz) Au from placer deposits, mainly from the Nyac and Donlin Creek areas (fig. D-3).

85 **Goodnews Bay** - Major placer Pt district; estimated to have produced over 17,261 kg (555,000 oz) refined PGE metals from 1934 to 1976; one of the largest known PGE metal resources in United States. Possible resources of 45 million m^3 (60 million yd^3) of deep, PGE-bearing gravels remain. Lode source believed to be Alaskan-type zoned ultramafic complex of Jurasssic or Cretaceous age. Possible significant offshore placer potential (fig. D-3).

86 **Apollo-Sitka mines** - Major lode Au deposits; produced more than 3,347 kg (107,600 oz) Au from ore that averaged about 7.5 g/tonne (0.22 oz/ton) Au. Inferred reserves are 678,440 tonnes (748,000 tons) grading 26 g/tonne (0.76 oz/ton) Au, 74 g/tonne (2.16 oz/ton) Ag, with base metal credits (fig. D-3).

87 **Pyramid** - Late Tertiary porphyry Cu-Mo deposit; inferred reserves of 113 million tonnes (125 million tons) ore that grade 0.4% Cu and 0.03% Mo reported (fig. D-2).

88 **Ivanof** - Late Tertiary porphyry Cu prospect; grades of up to 0.72% Cu reported. Potential for large tonnages (fig. D-2).

89 **Weasel Mountain, Bee Creek** - Porphyry Cu-Mo prospect of late Tertiary to Quaternary age; grades of up to 0.48% Cu and 0.035% Mo reported. Potential for moderate tonnages of low-grade mineralization (fig. D-2).

90 **Mike deposit** - Porphyry Mo prospect of late Tertiary age; grades of up to 0.21% Mo reported. Potential for large tonnages of low-grade Mo mineralization (fig. D-2).

91 **Rex deposit** - Porphyry Cu prospect similar to locality 90; grades of up to 0.3% Cu reported. Potential for moderate reserves of low-grade mineralization (fig. D-2).

92 **Kasna Creek** - Major stratiform Cu-Pb-Zn and skarn-sulfide deposits of Mesozoic age in mafic, volcanic, and sedimentary rocks; reported reserves of over 9,070,000 tonnes (10 million tons) ore that grade more than 1% Cu (fig. D-1).

93 **Sleitat Mountain** - High-grade east-west-trending, Sn-W-Ag topaz-quartz greisen system hosted in 59 million-year-old old binary granite and in hornfels. Zone up to 1,915 m (3,000 ft) long and 152 m (500 ft) wide. One drill-hole showed 26 m (85 ft) of 1.8% Sn, and 0.4% W. Inferred resources are 58 to 96 million kg (128 to 212 million lb) Sn in 26.3 million tonnes (29 million tons) ore (fig. D-2).

94 **Jimmy Lake** - Complex Cu-Ag-Sn mineralization of late Tertiary(?) age; reported grades of up to 3,599 g/tonne (105 oz/ton) Ag and 3% Cu (fig. D-1).

95 **Haines Barite** - Major stratiform Ba-Pb-Zn-Cu-Ag deposit in pillow basalt-dominated section of Paleozoic or Triassic age; consists of 15- to 18-m (48- to 60-ft)-thick zone of 60% barite with upper zone [0.6 to 2.4 m (2 to 8 ft) thick] of massive sulfides that contain 2% Pb, 3% Zn, 1% Cu, up to 137 g/tonne (4 oz/ton) Ag, and 4 g/tonne (0.12 oz/ton) Au. Estimated to contain 680,250 tonnes (750,000 tons) of 65% barite with Zn and Ag credits (fig. D-1).

96 **Klukwan** - Major Fe-Ti deposits in zoned ultramafic complex of Mesozoic age; reported to contain 2.7 billion tonnes (3 billion tons) of material that contains 16.8% Fe and 1.6 to 3.0% Ti (fig. D-3).

97 **Nunatak** - Porphyry Mo deposit; reported reserves of 7.7 million tonnes (8.5 million tons) ore that grades 0.125% Mo and 117 millions tonnes (129 million tons) of 0.04% Mo (fig. D-2).

98 **Brady Glacier** - Major Ni-Cu deposit in layered gabbro-pyroxenite complex of Tertiary age. Proven reserves of 91 million tonnes (100 million tons) ore that grade 0.5% Ni, 0.3% Cu reported and about 0.03% Co; also contains PGE concentrations (fig. D-3).

99 **Mertie Lode and Funter Bay mining district** - Contains substantial reserves of lode Au mineralization. Past production totaled about 466 kg (15,000 oz) Au. Deposits also contain significant Ni-Cu and Pb-Zn-Ag mineralization. Funter Bay deposit contains reported reserves of 507,920 tonnes (560,000 tons) that grade 0.34% Ni, 0.35% Cu, and 0.15% 0Co in gabbro-pipe system (fig. D-3).

100 **Alaska-Juneau** - Major lode Au deposit that consists of 30 to 90 m (100- to 300-ft) wide zone that contains en echelon, Au-bearing quartz veins in metamorphic rocks; produced more than 109,482 kg (3.52 million oz) Au from 80 million tonnes (88.5 million tons) ore from 1893 to 1944. Reserves (all categories), of 96 million tonnes (105.7 million tons) of 1.7 g/tonne (0.05 oz/ton) Au remain (fig. D-3).

101 **Chichagof and Hirst Chichagof** - Major lode-Au deposits in quartz veins that cut Mesozoic graywacke; produced more than 23,949 kg (770,000 oz) Au, most of which was produced at Chichagof mine. Inferred leased reserves estimated to be 3,110 kg (100,000 oz) Au (fig. D-2).

102 **Mirror Harbor** - Ni-Cu mineralization in layered-gabbro complex of Mesozoic age; reported proven reserves of 7,256 tonnes (8,000 tons) of 1.57% Ni and 0.88% Cu and reported inferred reserves of several million tons ore that grade 0.2% Ni and 0.1% Cu (fig. D-3).

103 **Bohemia Basin** - Major Ni-Cu-Co mineralization in layered mafic complex similar to locality 102; reported reserves of 20 million tonnes (22 million tons) ore that grade 0.33 to 0.51% Ni, 0.21 to 0.27% Cu, and 0.02% Co, all of which are recoverable with standard flotation technology (fig. D-3).

104 **Apex-El Nido** - Significant lode Au-W deposits that occur as crosscutting veins in graywacke; produced more than 1,555 kg (50,000 oz) Au (fig. D-3).

105 **Greens Creek** - Major sediment-hosted Pb-Zn-Cu-Ag-Au volcanogenic massive sulfide deposit of Devonian or Triassic age; most recent reserve estimate of the original oredbody is 10 million tonnes (11.0 million tons) grading 4.1 g/tonne (0.12 oz/ton) Au, 456 g/tonne (13.3 oz/ton) Ag, 12.8% Zn, and 4.0% Pb. Additional reserves in the southwest orebody are 1.81 million tonnes (2.0 million tons) grading 13.5% Zn, 5.5% Pb, 9.25 g/tonne (0.27 oz/ton) Au, and 1,131 g/tonne (33 oz/ton) Ag. Total combined reserves and resources of the mine are estimated to be 16.34 million tonnes (18 million tons) (fig. D-1).

106 **Sumdum** - Volcanogenic Cu-Pb-Zn massive sulfide deposit in Mesozoic metamorphic complex with potential strike length of over 3,048 m (10,000 ft). Inferred reserves of 24 million tonnes (26.7 million tons) ore that grade 0.57% Cu, 0.37% Zn, and 10 g/tonne (0.3 oz/ton) Ag reported (fig. D-1).

107 **Snettisham** - Fe-Ti deposit in mafic zoned-intrusive complex; reported grades of about 18.9% Fe and 2.6% Ti (fig. D-3).

108 **Tracy Arm** - Strata-bound Cu-Zn-Pb massive sulfide prospect in Mesozoic schist; over 335 m (1,100 ft) long and up to 3.7 m (12 ft) thick. Reported grades of 1.5% Cu, 3.9% Zn, 26 g/tonne (0.76 oz/ton) Ag, and 0.44 g/tonne (0.013 oz/ton) Au (fig. D-1).

109 **Red Bluff Bay** - Significant chrome mineralization in Mesozoic ultramafic complex (probably ophiolite); reported reserves of 517 tonnes (570 tons) of material that grade 40% Cr and 26,303 tonnes (29,000 tons) that grade 18 to 35% Cr (fig. D-3).

110 **Cornwallis Peninsula** - Volcanogenic Cu-Pb-Zn-Ag-Ba massive sulfide deposit of Triassic(?) age; reported grades of up to 20% Pb-Zn and 788 g/tonne (23 oz/ton) Ag 9 (fig. D-1).

111 **Castle Island** - Stratiform barite deposit of Triassic age hosted in carbonate and pillow basalt; about 776,390 tonnes (856,000 tons) of raw and refined barite produced from 1963 to 1980; also contains Zn, Pb, and Cu sulfides. Reported to be mined out (fig. D-1).

112 **Groundhog Basin** - Area contains several massive sulfide prospects in Mesozoic schist and gneiss whose origins are now thought to be plutonic associated. Reported grades of up to 8% Pb, 994 g/tonne (29 oz/ton) Ag, and 17 g/tonne (0.5 oz/ton) Au. Sn has also been recently identified. Area also contains potential for porphyry Mo deposits (fig. D-1).

113 **Snipe Bay** - Ni-Cu deposit in zoned mafic-ultramafic complex; inferred reserves of 390,000 tonnes (430,000 tons) of 0.3% Ni, 0.3% Cu, and 4.4 g/tonne (0.13 oz/ton) Ag reported (fig. D-3).

114 **Kasaan Peninsula** - Major skarn-type Cu-Fe-Au massive sulfide deposit of Jurassic age; area has produced over 12.7 million kg (28 million lb) Cu, and 1,711 kg (55,000 oz) Ag. Reported reserves of 3.6 million tonnes (4 million tons) ore that grade 50% Fe and less than 2% Cu (fig. D-1).

115 **Salt Chuck** - Cu-PGM-Ag-Au deposit in contact zone between pyroxenite and gabbro within Alaskan-type zoned mafic-ultramafic pluton. From 1900 to 1941, 2.3 million kg (5 million lb) Cu, over 622 kg (20,000 oz) PGM, and Au and Ag credits were produced from 294,775 tonnes (325,000 tons) ore (fig. D-3).

116 **Union Bay** - Significant Fe-Ti mineralization in ultramafic complex; area also contains Pt and V concentrations (fig. D-3).

117 **Hyder mining district** - Area produced more than 22,675 tonnes (25,000 tons) high-grade W-Cu-Pb-Zn-Ag ore from 1925 to 1951 from crosscutting ore shoots in Texas Creek granodiorite of Tertiary age. Area also contains potential for porphyry Mo-W mineralization and massive sulfide-skarn Pb-Ag-Au-W deposits (figs. D-1 and D-2).

118 **Jumbo** - Cu-Fe-Mo-Ag skarn deposit; produced more than 4.5 million kg (10 million lb) Cu, 8,708 kg (280,000 oz) Ag, and 218 kg (7,000 oz) Au from 113,375 tonnes (125,000 tons) ore. Zoned magnetite-Cu skarns are associated with epizonal granodiorite pluton of Cretaceous age. Reported reserves of 589,550 tonnes (650,000 tons) ore that grade 45.2% Fe, 0.75% Cu, 0.3 g/tonne (0.01 oz/ton) Au, and 2.74 g/tonne (0.08 oz/ton) Ag (fig. D-1).

119 **Copper City** - Stratiform Cu-Zn-Ag-Au massive sulfide deposit hosted in late Precambrian or earliest Paleozoic Wales Group. Reported grades of up to 12.7% Cu, 2.7% Zn, 86 g/tonne (2.5 oz/ton) Ag, and 6.9 g/tonne (0.2 oz/ton) Au (fig. D-1).

120 **Quartz Hill** - A porphyry molybdenum deposit hosted in a 25 million-year-old composite felsic pluton. Probable reserves, according to Cominco Ltd., are 210 million tonnes (232 million tons) with a grade of 0.22% MoS_2, and possible reserves are 1.1 billion tonnes (1.2 billion tons) with 0.12% MoS_2 (fig. D-2).

121 **Niblack** - Volcanogenic Cu-Pb-Au-Ag massive sulfide deposit hosted in Precambrian(?) Wales Group or Ordovician to Silurian Descon Formation; produced more than 635,000 kg (1.4 million lb) Cu, 342 kg (11,000 oz) Au, and 467 kg (15,000 oz) Ag (fig. D-1).

122 **Bokan Mountain** - Numerous U-Th prospects associated with Jurassic peralkaline intrusive complex; from 1955 to 1971, produced more than 108,840 tonnes (120,000 tons) ore that graded about 1% U_3O_8. Contains inferred reserves of about 36.2 million tonnes (40 million tons) of 0.126% Nb and up to 1% REE metals (fig. D-3).

123 **Kemuk Mountain** - Magmatic Fe-Ti deposit hosted in Cretaceous(?) pyroxenite. Inferred reserves of 2.17 billion tonnes (2.4 billion tons) that average 15 to 17% Fe, 2 to 3% TiO_2, and 0.16% P_2O_5 (fig. D-3).

124 **McLeod** - Porphyry Mo deposit that contains quartz-molybdenite fissure veins in quartz-feldspar porphyry. Chip samples contain up to 0.09% Mo (fig. D-2).

125 **Johnson River** - Epigenetic(?) quartz-sulfide stockwork or massive sulfide deposit hosted in volcaniclastic, pyroclastic, and volcanic rocks of Jurassic Talkeetna Formation. Deposit has drilled out reserves at a $50/tonne cutoff with no cut of high Au assays, 997,542 tonnes grading 10.35 gram Au, 7.84 gm Ag, 0.76% Cu, 1.17 Pb, and 8.37% Zn (fig. D-3).

126 **Nimiuktuk River** - Small hill of massive, high-grade barite estimated to contain at least 1.36 million tonnes (1.5 million tons) barite. Widespread stream-sediment Ba anomalies in area indicate further barite potential (fig. D-1).

127 **Kensington** - Stockworks of quartz veins in sheared and chloritized quartz diorite produced 9,886 tonnes (10,900 tons) grading 6 g/tonne (0.18 oz/ton) Au prior to 1930. Recent reserve estimates indicate at least 10.4 million tonnes (11.5 million tons) grading 4.9 g/tonne (0.143 oz/ton) Au. Subparallel Horrible vein system contains 3.56 million

tonnes (3.93 million tons) grading 3.7 g/tonne (0.11 oz/ton) Au (fig. D-3).

128 **Jualin** - Five quartz-fissure veins in Cretaceous quartz diorite, more than 4,573 m (15,000 ft) of underground workings; produced 1,505 kg (48,387 oz) Au, mainly prior to 1930. Reserves estimated at 0.97 million tonnes (1.07 million tons) of 12 g/tonne (0.349 oz/ton) Au (fig. D-3).

129 **Pebble Copper** - Cu-Au porphyry with identified resource of 454 million tonnes (500 million tons) grading 0.35% Cu and 0.4 g/tonne (0.012 oz/ton) Au with Mo in the 0.03% to 0.04% range (fig. D-1).

Appendix E

Mining licenses issued by and received from the Alaska Department of Revenue, 1994

Entries include in this order: company name, (region), address, resource, site of operation, mining district, and license number. Alaska Peninsula Region (APR), Eastern Interior Region (EIR), Northern Region (NR), Southcentral Region (SCR), Southwestern Region (SWR), Southeastern Region (SER), Undistributed (UR), Western Region (WR), and N/A indicates specific information not provided.

A & L Mining (WR)
Ralph Anderson
P.O. Box 1974
Nome, AK 99762
Gold
Coffee Creek
Kougarok district
ML 94 00358 1

Alamin Mining Corporation (WR)
112 Park Avenue
Int'l Falls, MN 56649
Gold
Bear, Cripple, and Graham Creeks
Innoko-Tolstoi district
ML 94 00520 1

Alaska Gold Company (WR)
P.O. Box 640
Nome, AK 99762
Gold
Third Beach
Cape Nome district
ML 94 00293 1

Alaska Gold Company (WR)
P.O. Box 640
Nome, AK 99762
Gold
Cape Nome district
ML 94 00398 1

Alaska Placer Development Inc. (EIR)
P.O. Box 81467
Fairbanks, AK 99709
Gold
Livengood Creek
Tolovana-Livengood district
ML 94 00283 1

Albertson, C. Caniel & Diann (SCR)
P.O. Box 87
St. Anthony, ID 83445
Gold
Lake Creek
Yentna-Cache Creek district
ML 94 00545 1

Anchorage Sand and Gravel Co. (SCR)
1040 O'Malley Rd.
Anchorage, AK 99515
Sand & gravel
Palmer loading terminal pit
Palmer
ML 94 00246 1

Anderson & Son Mining (WR)
P.O. Box 277
McGrath, AK 99627
Gold
Yankee Creek
Innoko-Tolstoi district
ML 94 00063 1

Anderson, Gerald I. (SCR)
1013 E. Dimond Blvd., #168
Anchorage, AK 99515
Gold
Yacko Creek
Nelchina district
ML 94 00037 1

Anderson, John/Minder Richard (EIR)
P.O.Box 10263
Fairbanks, AK 99710
Gold
Chatanika River
Fairbanks district
ML 94 00546 1

AOS Mining & Engineering (EIR)
P.O. Box 72921
Fairbanks, AK 99707
Gold
Proximate Creek to Ruby Creek
Fairbanks district
ML 94 00547 1

APP Mining (WR)
P.O. Box 1230
Nome, AK 99762
Gold
Anvil Creek
Nome district
ML 94 00338 1

APP Mining (WR)
Bert Pettigrew
P.O. Box 1230
Nome, AK 99762
Gold
Oregon Creek
Cape Nome district
ML 94 00339 1

Appleford, Robert J. (EIR)
1055 Commerce
Fairbanks, AK 99709
Gold
Looney Creek
Hot Springs district
ML 94 00548 1

Arctic Mining (EIR)
373 Droz Dr.
Fairbanks, AK 99701
Gold
Crooked Creek
Circle district
ML 94 00575 1

AU Mining Co. (WR)
General Delivery
Candle, AK 99728
Gold
Candle Creek-Kewalik Flats
Candle district
ML 94 00240 1

AU Mining Co. (WR)
Rhinehart Berg
General Delivery
Candle, AK 99728
Gold
Mud Creek
Candle district
ML 94 00284 1

Aurora Mining (EIR)
P.O. Box 103820
Anchorage, AK 99510
Gold
North Fork Harrison
Circle district
ML 94 00118 1

B&B Mining (NR)
3910 Tilleson Way
North Pole, AK 99705
Gold
Magnet Creek
Koyukuk district
ML 94 00628 1

Badger Mining (WR)
Peter J. Johnson
1069 Badger Rd.
North Pole, AK 99705
Gold
Beach
Cape Nome district
ML 94 00622 1

Bayless Mining (EIR)
Michael Busby
47660 Falls Creek Dr.
Homer, AK 99603
Gold
Chicken Creek
Fortymile district
ML 94 00163 1

Beach, Curtis R. (NR)
P.O. Box 9032 Coldfoot CPU
Fairbanks, AK 99701
Gold
Sawyer Creek
Koyukuk-Nolan district
ML 94 00641 1

Beaver Loop Sand & Gravel (SCR)
Patrick & Mary Doyle
HC01 Box 1225
Kenai, AK 99611
Sand & gravel
Beaver Loop Road
Kenai district
ML 94 00291 1

Beck, Jessie D. Jr. (EIR)
P.O. Box 10
Chicken, AK 99732
Gold
South Fork Fortymile
Fortymile district
ML 94 00647 1

Beerman, W.J. (SCR)
2416 South 1st SE
Yakima, WA 98901
Gold
Chistochina and Copper Rivers
Chistochina district
ML 94 00096 1

Beistline, Earl (EIR)
P.O. Box 80148
Fairbanks, AK 99708
Gold
Cripple Creek
Circle district
ML 94 00089 1

Beistline, Earl (EIR)
P.O. Box 80148
Fairbanks, AK 99708
Gold
Mastadon Fork & My Creek
Circle district
ML 94 00094 1

Beistline, Earl (EIR)
P.O. Box 80148
Fairbanks, AK 99708
Gold
Eagle Creek
Circle district
ML 94 00401 1

Bering Straits Native Corp. (WR)
P.O. Box 1808
Nome, AK 99762
Sand & gravel
Hastings Creek
Cape Nome district
ML 94 00181 1

Big G Mining (EIR)
Hank Gradney
P.O. Box 74400
Fairbanks, AK 99707
Gold
Deadwood Creek
Circle district
ML 94 00009 1

Blake, Thomas Kerry (WR)
P.O. Box 543
Nome, AK 99762
Gold
Dome and Iron Creeks
Cape Nome district
ML 94 00331 1

Bluff, Ray E. (EIR)
P.O. Box 1999
Cottonwood, AZ 86326
Gold
Little Boulder Creek
Hot Springs district
ML 94 00639 1

Bolin-Criswell Exploration (NR)
21650 Graybill St.
Chugiak, AK 99567
Gold
Weise Creek
Squirrel River district
ML 94 00646 1

Boulder Creek Mining Co. #2 (EIR)
Limited Partnership
8231 Xavier Way
Everett, WA 98203
Gold
Boulder Creek
Hot Springs district
ML 94 00112 1

Bouton, Glenn D. (NR)
665 Farmers Loop Rd.
Fairbanks, AK 99712
Gold
M.F. Koyukuk
Koyukuk-Nolan district
ML 94 00005 1

Bradley, Joe (SCR)
1807 E. Dimond
Anchorage, AK 99503
Gold
Mills Creek
Yentna-Cache Creek district
ML 94 00342 1

Bras, Cy T. (EIR)
P.O. Box 2764
Kenai, AK 99611
Gold
Canyon Creek
Fortymile district
ML 94 00227 1

Brittaw, Jon (EIR)
P.O. Box 115
Hope, AK 96605
Gold
South Fork Fortymile
Fortymile district
ML 94 00554 1

Bruce D. Morley Inc. (SER)
9128 N. Douglas
Juneau, AK 99801
Sand & gravel
Juneau district
ML 94 00555 1

Bucholz, Gary (WR)
2004 Old Steese N.
Fairbanks, AK 99712
Gold
Bear Creek
Gold Hill-Melozitna district
ML 94 00032 1

Bud's Gravel Services (SCR)
Jason C. Johnson
P.O. Box 194
Anchor Point, AK 99556
Sand & gravel
Homer
ML 94 00635 1

Cacy, Robert N./Catt, Bruce (EIR)
P.O. Box 45
Central, AK 99730
Gold
Portage Creek
Circle district
ML 94 00343 1

Carlson, Robert D. (SCR)
P.O. Box 771375
Eagle River, AK 99577
Gold
Upper Cache Creek
Yentna-Cache Creek district
ML 94 00333 1

Carroll-Vondra Inc. (EIR)
Yutan Construction Co.
P.O. Box 71775
Fairbanks, AK 99707
Sand & gravel
Brown's Hill
Fairbanks district
ML 94 00207 1

Central Alaska Mining (EIR)
P.O. Box 80649
Fairbanks, AK 99708
Gold
Harrison Creek
Circle district
ML 94 00360 1

Clara Bea Inc. (WR)
P.O. Box 1285
Barrow, AK 99723
Gold
Candle Creek
Candle district
ML 94 00165 1

Cleveland, C.S. (EIR)
P.O. Box 1499
Bigfork, MT 59911
Gold
North Fork Harrison Creek
Circle district
ML 94 00281 1

Cleveland, C.S. (EIR)
P.O. Box 1499
Bigfork, MT 59911
Gold
North Fork Harrison Creek
Circle district
ML 94 00569 1

Colledge, Lyle (EIR)
P.O. Box 60478
Fairbanks, AK 99706
Gold
Bottom Dollar Creek
Circle district
ML 94 00095 1

Colzani, Robert (WR)
P.O. Box 1955
Nome, AK 99762
Gold
Anvil Creek
Cape Nome District
ML 94 00280 1

Colzani, Robert (WR)
P.O. Box 1955
Nome, AK 99762
Gold
Benson Creek
Kougarok district
ML 94 00528 1

Cominco Alaska Exploration (WR)
5660 B St.
Anchorage, AK 99518
Gold
Pebble Copper
Iliamna district
ML 94 00229 1

Cominco Alaska Exploration (WR)
5660 B St.
Anchorage, AK 99518
Gold
Rocky Mountain Creek
Cape Nome district
ML 94 00557 1

Congdon, Carl J. (EIR)
925 Commerical St.
Fairbanks, AK 99701
Gold
Quail Creek
Rampart district
ML 94 00558 1

Conway, James P. (SCR)
HC02 Box 7160
Palmer, AK 99645
Gold
Poorman Creek
Yentna-Cache Creek district
ML 94 00551 1

Cook's Mining (EIR)
P.O. Box 70456
Fairbanks, AK 99707
Gold
Fairbanks Creek
Fairbanks district
ML 94 00052 1

Cook's Mining (EIR)
P.O. Box 70456
Fairbanks, AK 99707
Gold
Fairbanks Creek
Fairbanks district
ML 94 00111 1

Cook's Mining (EIR)
P.O. Box 70456
Fairbanks, AK 99707
Gold
Deep Creek
Fairbanks district
ML 94 00245 1

Cook Inlet Region Inc. (SCR)
P.O. Box 93330
Anchorage, AK 99509
Sand & gravel
Seldovia
Homer district
ML 94 00559 1

Cook Inlet Region Inc. (SCR)
P.O. Box 93330
Anchorage, AK 99509
Sand & gravel
Seldovia
Homer district
ML 94 00560 1

Cook Inlet Region Inc. (SCR)
P.O. Box 93330
Anchorage, AK 99509
Sand & gravel
Tyonek
Redoubt district
ML 94 00561 1

Cook Inlet Region Inc. (SCR)
P.O. Box 93330
Anchorage, AK 99509
Sand & gravel
Eklutna
Anchorage district
ML 94 00562 1

Cook Inlet Region Inc. (SCR)
P.O. Box 93330
Anchorage, AK 99509
Sand & gravel
North Kenai
Sunrise-Seward district
ML 94 00563 1

Cook Inlet Region Inc. (SCR)
P.O. Box 93330
Anchorage, AK 99509
Sand & gravel
South Kenai
Homer district
ML 94 00564 1

Cook Island Partnership (SCR)
6129 Petersburg St.
Anchorage, AK 99507
Sand & gravel
Ind Park Sub
Anchorage district
ML 94 00531 1

Cook, John P./Plack, Phil (SCR)
5830 Columbus Way #6
Wasilla, AK 99654
Gold
Valdez Creek
Valdez Creek district
ML 94 00539 1

Cox, Cecil A. (EIR)
P.O. Box 79
Eagle, AK 99738
Gold
Fortymile River
Fortymile district
ML 94 00120 1

Cox, Cecil A. (EIR)
P.O. Box 79
Eagle, AK 99738
Gold
Fortymile River
Fortymile district
ML 94 00121 1

D.J. Hopkins Company (EIR)
David Hopkins
5617 2236th Ave. NE
Redmond, WA 98053
Gold
Dome Creek
Livengood-Tolovana district
ML 94 00633 1

Dart, James C. (EIR)
P.O. Box 18
Manley Hot Springs, AK 99756
Gold
Boulder Creek
Hot Springs district
ML 94 00007 1

Dempsey, Dan (SCR)
P.O. Box 606
Glennallen, AK 99588
Gold
Mineral Creek
Prince William Sound district
ML 94 00239 1

Derrick Enterprises Inc. (EIR)
P.O. Box 73574
Fairbanks, AK 99707
Gold
Crooked Creek
Circle district
ML 94 00336 1

Derrick Enterprises Inc. (EIR)
P.O. Box 73574
Fairbanks, AK 99707
Gold
Crooked Creek
Circle district
ML 94 00336 1

Dick, Robert D. (EIR)
6851 Chena Hot Springs Rd.
Fairbanks, AK 99712
Gold
Twelvemile Creek
Circle district
ML 94 00521 1

Diehl, Ray (EIR)
P.O. Box 153
Yerington, NV 89447
Gold
Platt Creek
Bonnifield district
ML 94 00565 1

Double D Mining (EIR)
Judd Edgerton
P.O. Box 3885
Palmer, AK 99645
Gold
Napoleon Creek
Fortymile district
ML 94 00242 1

Double T Mining (EIR)
Tom Swartwood
1905 SE 140th
Portland, OR 97233
Gold
Deadwood Creek
Fairbanks district
ML 94 00566 1

Dunshie, Jack (EIR)
4579 Woodriver Dr.
Fairbanks, AK 99701
Gold
Ruth Creek
Fairbanks district
ML 94 00567 1

Ellis, Ed (SCR)
P.O. Box 824
Cooper Landing, AK 99572
Gold
Lake Creek
Yentna-Cache Creek district
ML 94 00054 1

Ellis, Ed (SCR)
P.O. Box 824
Cooper Landing, AK 99572
Platinum Gr
Lake Creek
Yentna-Cache Creek district
ML 94 00101 1

Emerson, Robert C. (EIR)
1811 Phillips Field Rd.
Fairbanks, AK 99701
Gold
St. Patrick and Happy Creeks
Fairbanks district
ML 94 00173 1

Empire Exploration Inc. (SCR)
P.O. Box 142593
Anchorage, AK 99514
Gold
Willow Creek
Yentna-Cache Creek district
ML 94 00568 1

Faa, Thomas E. (EIR)
P.O. Box 3113
Healy, AK 99743
Gold
Eva Creek
Bonnifield district
ML 94 00619 1

Faa, Thomas E. (EIR)
HC1 Box 3113
Healy, AK 99743
Gold
Moose Creek
Bonnifield district
ML 94 00051 1

Faa, Thomas E. (EIR)
HC1 Box 3113
Healy, AK 99743
Gold
Rex Creek
Bonnifield district
ML 94 00570 1

Fabrizio, Jerry (SER)
4738 University Way NE
Seattle, WA 98105
Gold
Porcupine Creek
Porcupine district
ML 94 00060 1

Fairbanks Gold Mining Inc. (EIR)
P.O. Box 73726
Fairbanks, AK 99707
Gold
Fish Creek
Fairbanks district
ML 94 00361 1

Fat Chance Mining & Exploration (SCR)
Dan A. & Jeanelle E. Loy
3921 Truro Dr.
Anchorage, AK 99507
Gold
Various Creeks
Willow Creek district
ML 94 00636 1

Faulkner, Harry Sr. (SWR)
P.O. Box 1307
Bethel, AK 99559
Gold
Ophir Creek
Aniak district
ML 94 00301 1

Fejes, William C. (NR)
P.O. Box 8163
Nikiski, AK 99635
Gold
Boulder Creek
Koyukuk-Nolan district
ML 94 00518 1

Fichtelman, Guy/Collier Don (EIR)
P.O. Box 70
Chicken, AK 99732
Gold
Fortymile River
Fortymile district
ML 94 00571 1

Fine, Larry/Stec, Russell (SCR)
P.O. Box 940316
Houston, AK 99694
Gold
East Fork Iron Creek
Valdez Creek district
ML 94 00621 1

Flat Creek Placers (SWR)
John Fullerton
16935 Maplewild SW
Seattle, WA 98166
Gold
Willow Creek
Iditarod district
ML 94 00523 1

Flat Pick Mining (EIR)
P.O. Box 115
Central, AK 99730
Gold
Switch Creek
Circle district
ML 94 00572 1

Four Brothers Mining (EIR)
P.O. Box 81117
Fairbanks, AK 9708
Gold
Totatlanika River
Fairbanks district
ML 94 00573 1

Franklin, Patricia S. (EIR)
1213 Coppet St.
Fairbanks, AK 99709
Gold
Fairbanks Creek
Fairbanks district
ML94 00574 1

G.A. Hanks & Sons (EIR)
18908 Old River Rd.
W. Sacramento, CA 95691
Gold
Lost Chicken Creek
Fortymile district
ML 94 00140 1

Gavora, Steve (EIR)
1967 Camomile Lane
Fairbanks, AK 99712
Gold
Fairbanks Creek
Fairbanks district
ML 94 00375 1

Geo Holding Inc. (SCR)
c/o J.W. Rayn
3101 N. Central Ave., #1600
Phoenix, AZ 85912
Gold
Beach Uplands area
Yakataga district
ML 94 00543 1

Gerald W. Hooper & Assoc. (NR)
P.O. Box 875272
Wasilla, AK 99687
Gold
Swift Creek
Koyukuk-Nolan district
ML 94 00307 1

Gibson, Wayne (WR)
1610 Southern Ave.
Fairbanks, AK 99709
Gold
Golden Creek
Gold Hill-Melozitna district
ML 94 00243 1

Gibson, Wayne (EIR)
1610 Southern Ave.
Fairbanks, AK 99709
Gold
Clums Fork/Volcano Creek
Circle district
ML 94 00540 1

Girdwood Mining Co. (SCR)
P.O. Box 1089
Girdwood, AK 99587
Gold
Crow Creek
Anchorage district
ML 94 00231 1

Glassburn, Don (EIR)
P.O. Box 107
Central, AK 99730
Gold
Gold Dust Creek
Circle district
ML 94 00150 1

Global Resources Inc. (WR)
P.O. Box 1042
Nome, AK 99762
Gold
Cripple River
Cape Nome district
ML 94 00347 1

Gold Hill Mining Co. (EIR)
30033 Redwood Hwy.
Cave Junction, OR 97523
Gold
Harrison Creek
Circle district
ML 94 00644 1

Golden Slipper (EIR)
Joe B. Hall
4694 Palo Verde
Fairbanks, AK 99709
Gold
Marshall Gulch
Fairbanks district
ML 94 00611 1

Goldorado Company (SCR)
Tod Bauer
P.O. Box 871502
Wasilla, AK 99687
Gold
Eldorado Creek
Valdez Creek district
ML 94 00316 1

Goldstream Joint Venture (EIR)
1937 Old Steese Hwy N.
Fairbanks, AK 99712
Gold
Gilmore Creek
Fairbanks district
ML 94 00576 1

Goldust Mines (NR)
P.O. Box 61520
Fairbanks, AK 99706
Gold
St. Mary's Creek
Chandalar district
ML 94 00241 1

Golovin Native Corporation (WR)
P.O. Box 62099
Golovin, AK 99762
Sand & gravel
Golovin Native Lands
Cape Nome district
ML 94 00334 1

Goodson, Richards (EIR)
P.O. Box 12
Chicken, AK 99732
Gold
South Fork Fortymile River
Fortymile district
ML 94 00526 1

Grateful Dog Mining (EIR)
Roger McPherson
1100 Southwood Lane
Fairbanks, AK 99712
Gold
O'Conner Creek
Fairbanks district
ML 94 00174 1

Grateful Dog Mining (EIR)
Roger McPherson
1100 Southwood Land
Fairbanks, AK 99712
Gold
Ridge above Treasure Creek
Fairbanks district
ML 94 00582 1

Green Mining & Exploration (WR)
P.O. Box 61455
Fairbanks, AK 99706
Gold
Birch Creek
Ruby-Poorman district
ML 94 00605 1

Groppel, Chril L. (EIR)
P.O. Box 1060
Delta Junction, AK 99737
Gold
Tenderfoot Creek
Fairbanks district
ML 94 00213 1

Gumaer, Mark (WR)
P.O. Box 1682
Nome, AK 99762
Gold
Dick Creek
Kougarok district
ML 94 00348 1

Gustafson, Bruce (EIR)
1787 Bobanna Lane
North Pole, AK 99705
Gold
Cody Creek
Bonnifield district
ML 94 00577 1

Ham Mining Co. (EIR)
Harold Mitchell
P.O. Box 65
Chicken, AK 99732
Gold
Misquito Fork
Fortymile district
ML 94 00200 1

Hannah, John (EIR)
P.O. box 6117
Fairbanks, AK 99706
Gold
Flume Creek
Fairbanks district
ML 94 00108 1

Heflinger, Fred (EIR)
P.O. Box 82390
Fairbanks, AK 99708
Gold
Walker Fork Fortymile River
Fortymile district
ML 94 00391 1

Henshaw, Byron (SCR)
1850 Red Fox Dr.
Wasilla, AK 99654
Gold
Grogg Creek
Valdez Creek district
ML 94 00385 1

Herndon & Thompson Leasing Co. (SCR)
41745 Bear Creek Dr.
Homer, AK 99603
Sand & gravel
Parcel I, Parcel II
Homer district
ML 94 00249 1

Herndon & Thompson Leasing Co. (SCR)
41745 Bear Creek Dr.
Homer, AK 99603
Sand & gravel
Tract A
Homer district
ML 94 00250 1

Herzog, Martin M. (SCR)
3817 South Carson St. #428
Carson City, NV 89701
Gold
Cache Creek
Yentna-Cache Creek district
ML 94 00162 1

Hill, Jim (SCR)
810 E. 42nd PL #2B
Anchorage, AK 99503
Gold
Quartz Creek
Seward district
ML 94 00578 1

Hoffman, Russell (SCR)
HC60 Box 153
Copper Center, AK 99573
Gold
Chistochina River
Chistochina district
ML 94 00276 1

Holland, Lee (EIR)
HC 33 Box 32940
Nenana, AK 99760
Gold
Above Ester Creek
Fairbanks district
ML 94 00164 1

Hope Mining Company (SCR)
P.O. Box 1010827
Anchorage, AK 99510
Gold
Resurrection Creek
Seward district
ML 94 00237 1

Hopen, Alf (EIR)
P.O. Box 74246
Fairbanks, AK 99707
Gold
Little Eldorado Creek
Fairbanks district
ML 94 00125 1

Hopen, Alf (EIR)
P.O. Box 74246
Fairbanks, AK 99707
Gold
Cleary Creek
Fairbanks district
ML 94 00522 1

Hunt, Jim (NR)
P.O. Box 9061
Coldfoot, AK 99701
Gold
Slate Creek
Koyukuk-Nolan district
ML 94 00534 2

Interior Accoutants Inc. (EIR)
Joe Vogler (Lynn Vogler)
935 Aurora Dr.
Fairbanks, AK 99709
Gold
Ketchum Creek
Circle district
ML 94 00549 1

Ireys, Charles G. (EIR)
P.O. Box 431
Northway, AK 99764
Gold
McArthur Creek
Fortymile district
ML 94 00631 1

J&B Development (NR)
16655 Eagle River Rd.
Eagle River, AK 99577
Gold
Hammond River
Koyukuk-Nolan district
ML 94 00255 1

Jackson Mining Co. (EIR)
936 Coppet St.
Fairbanks, AK 99709
Gold
Totatlanika River
Bonnifield district
ML 94 00349 1

Jiles, O.J. (NR)
5250 Auburn-Folsom Rd.
Loomis, CA 95650
Gold
Hammond River
Koyukuk-Nolan district
ML 94 00217 1

Jim/Mar Mining Ventures (SCR)
James Luhrs
3333 Lakeshore Dr. #8
Anchorage, AK 99517
Gold
Alfred Creek
Nelchina district
ML 94 00538 1

K.L.K. Inc. (EIR)
P.O. Box 80067 D
Fairbanks, AK 99708
Gold
Faith, Hope, and Charity Creeks
Circle district
ML 94 00306 1

Keener, Jeff (WR)
P.O. Box 82811
Fairbanks, AK 99708
Gold
Auburn and Ravine Creeks
Council district
ML 94 00327 1

Keller, Robert W. (EIR)
P.O. Box 113
Healy, AK 99743
Gold
Totatlanika River
Bonnifield district
ML 94 00192 1

Kelly, Timothy (EIR)
1530 W 13th Ave.
Anchorage, AK 99501
Gold
North Fork Creek
Hot Springs district
ML 94 00350 1

Kennecott-Greens Creek Mining Company (SER)
P.O. Box 32199
Juneau, AK 99803
All types
Greens Creek, Admiralty Island
Juneau
ML 94 00288 1

Kiehl, Don T. (EIR)
3210 Marneet
North Pole, AK 99705
Gold
Gold King Creek
Bonnifield district
ML 94 00300 1

Kile, Alvin & Eric (EIR)
P.O. Box 140424
Anchorage, AK 99514
Gold
Canyon Creek
Fortymile district
ML 94 00193 1

Killion, M.T. (EIR)
P.O. Box 70195
Fairbanks, AK 99707
Gold
Goldstream Creek
Fairbanks district
ML 94 00519 1

Kirsch, Bob (SCR)
P.O. Box 826
Kenai, AK 99611
Gold
Crescent Creek
Seward district
ML 94 00529 1

Kirsch, Bob (SCR)
P.O. Box 82644
Kenai, AK 99611
Gold
Crescent Creek
Seward district
ML 94 00529 1

Klopman, Jamin (SWR)
P.O. Box 243862
Anchorage, AK 99524
Gold
Taylor Creek
Aniak district
ML 94 00513 1

Knutsen, Theodore (EIR)
2326 St. Elias Dr.
Anchorage, AK 99517
Gold
Birch Creek
Circle district
ML 94 00550 1

Kralik, Jan (WR)
P.O. Box 1793
Nome, AK 99762
Gold
Gold Run
Port Clarence district
ML 94 00579 1

Krizak, Rudy W. (WR)
P.O. Box 1253
Nome, AK 99762
Gold
Crooked Creek
Nome district
ML 94 00351 1

Krutzsch, Betty (WR)
P.O. Box 1567
Nome, AK 99762
Gold
Speciman Gulch
Nome district
ML 94 00643 1

Krzykowski, Ben (EIR)
P.O. Box 72544
Fairbanks, AK 99707
Gold
Big Eldorado Creek
Fairbanks district
ML 94 00088 1

Kurt's Construction (EIR)
Kurt A. Ueeck
HC60 Box 33560
Delta Junction, AK 99737
Gravel
Milltan Road area
Fairbanks district
ML 94 00195 1

Lalonde, William J. (EIR)
P.O. Box 926
Rainier, OR 97048
Gold
South Fork Fortymile River
Fortymile district
ML 94 00610 1

Lance, Frank W. (N/A)
P.O. Box 9054
Fairbanks, AK 99701
Gold
Acme Creek
N/A
ML 94 00525 1

Lankford, Steve (SCR)
HC 89 Box 540
Willow, AK 99688
Gold
Albert Creek
Nelchina district
ML 94 00184 1

Las, Alan (EIR)
P.O. Box 10243
Fairbanks, AK 99710
Gold
Smith and Poole Creeks
Fairbanks district
ML 94 00029 1

Leach, Clifford (EIR)
P.O. Box 25
Chicken, AK 99732
Gold
South Fork Fortymile River
Fairbanks district
ML 94 00580 1

Leach, Clifford Jr. (EIR)
P.O. Box 25
Chicken, AK 99732
Gold
South Fork Fortymile River
Fairbanks district
ML 94 00580 1

Lee, Daniel M. (EIR)
HC03 Box 8383
Palmer, AK 99645
Gold
Cherry and No Name Creeks
Fortymile district
ML 94 00581 1

Leov, Pette H. (SWR)
P.O. Box 589
Sterling, AK 99672
Gold
Otter Creek
Iditarod district
ML 94 00645 1

Lester Mines (EIR)
Ray Lester
732 Old Steese Hwy., #8
Fairbanks, AK 99712
Gold
Birch Creek
Circle district
ML 94 00623 1

Lester Mines (EIR)
Ray Lester
732 Old Steese Hwy #8
Fairbanks, AK 99712
Gold
Butte Creek
Circle district
ML 94 00624 1

Lillian Creek Mine Inc. (EIR)
P.O. Box 60334
Fairbanks, AK 99706
Gold
Lillian Creek
Livengood-Tolovana district
ML 94 00364 1

Little Eldorado Gold Camp (EIR)
Andrew & Pamela Wescott
1975 Discovery Dr.
Fairbanks, AK 99701
Gold
Fox Creek Gulch
Fairbanks district
ML 94 00147 1

Little Eldorado Group (EIR)
W.L. Shafer
P.O. Box 80148
Fairbanks, AK 99708
Gold
Little Eldorado Creek
Fairbanks district
ML 94 00403 1

Loud, Richard L. (EIR)
P.O. Box 10570
Fairbanks, AK 99710
Gold
Harrison Creek
Circle district
ML 94 00233 1

Lucky Strike Mining Co. (EIR)
105 Dunbar Ave.
Fairbanks, AK 99701
Gold
Gilmore Creek
Fairbanks district
ML 94 00642 1

Lyman Resources in Alaska Inc. (SWR)
P.O. Box 192
McGrath, AK 99627
Gold
Snow Gulch, Crooked
Iditarod district
ML 94 00082 1

MacDonald, Robert J. (EIR)
2829A Wronderl Way
Reno, NV 89502
Gold
Sourdough Creek
Fairbanks district
ML 94 00155 1

MacMartin, Duncan W. (EIR)
1305 Polar Dr.
Fairbanks, AK 99712
Gold
Pedro Creek
Fairbanks district
ML 94 00583 1

Marchuk, Nikolas (EIR)
P.O. Box 89
Delta Junction, AK 99737
Gold
Rainy Creek
Delta River district
ML 94 00620 1

Martinson, Douglas E. (WR)
P.O. Box 52
Nome, AK 99762
Gold
Kougarok River
Cape Nome district
ML 94 00612 1

Martinson, Douglas E. (WR)
P.O. Box 52
Nome, AK 99762
Gold
Kougarok River
Kougarok district
ML 94 00613 1

Martinson, Douglas E. (WR)
P.O. Box 52
Nome, AK 99762
Gold
Kougarok River
Kougarok district
ML 94 00614 1

Martinson, Douglas E. (WR)
P.O. Box 52
Nome, AK 99762
Gold
Kougarok River
Cape Nome district
ML 94 00615 1

Mascott Mining Inc. (NR)
P.O. Box 2643
Ridgway, CO 81432
Gold
Hammond River, Vermont Creek
Koyukuk district
ML 94 00170 1

Mat-Su Aggregate (SCR)
Merwin L. Arneson
P.O. Box 737
Palmer, AK 99645
Sand & gravel
Anchorage district
ML 94 00356 1

Maxwell, Leslie or Barbara (EIR)
P.O. Box BYA
c/o Boundary Lodge
Tok, AK 99780
Gold
Canyon Creek
Fortymile district
ML 94 00214 1

McClanahan, Robert C. (EIR)
P.O. Box 41
Chicken, AK 99732
Gold
Bailey Creek
Fortymile district
ML 94 00274 1

Mespelt & Almasy Mining Co. (WR)
M.L. Mespelt & T.J. Almasy
P.O. Box 74
McGrath, AK 99637
All types
Nixon Fork Mines
McGrath-McKinley district
ML 94 00638 1

Metco Inc. (SCR)
HCR 64 Box 300
Seward, AK 99664
Sand & gravel
Folz Subdivision
Seward district
ML 94 00544 1

Miller Creek Mining Co. (EIR)
P.O. Box 2702
Fairbanks, AK 99707
Gold
Ketchum Creek
Circle district
ML 94 00536 1

Minex Alaska Inc. (SCR)
P.O. Box 103
Girdwood, AK 99587
Gold
Beach
Kodiak-Unga Island district
ML 94 00022 1

Misco-Walsh Mining Co. (SWR)
John Miscovich
1093 N. Greengrove St.
Orange, CA 92667
Gold
Otter Creek
Iditarod district
ML 94 00084 1

Miscovich Mining Co. (WR)
Howard P. Miscovich
P.O. Box 262
Galena, AK 99741
Gold
Poorman Creek
Ruby-Poorman district
ML 94 00056 1

Miscovich, Andrew W. (EIR)
P.O. Box 71489
Fairbanks, AK 99707
Gold
Chatham Creek
Fairbanks district
ML 94 00139 1

Miscovich, Andrew W. (NR)
P.O. Box 71489
Fairbanks, AK 99709
Gold
Middle Fork Koyukuk River
Koyukuk district
ML 94 00584 1

Montgomery, Melvin or Lois (EIR)
6028 Mackay
Anchorage, AK 99518
Gold
Gilliland Creek
Fairbanks district
ML 94 00640 1

N.B. Tweet & Sons (WR)
P.O. Box 1107
Nome, AK 99762
Gold
Kougarok River
Kougarok district
ML 94 00070 1

Nevada Star Resources (N/A)
P.O. Box 10322
Vancouver, BC V7Y 1G5
Gold
N/A
Kuskokwim River Basin
ML 94 00637 1

Nevers, Harold A. (EIR)
8148 Pinewood Dr.
Juneau, AK 99801
Gold
American Creek
Fortymile district
ML 94 00202 1

Nicholson, Doug/Frantz, Peter (NR)
3865 Ullrbahn
Fairbanks, AK 99708
Gold
Linda Creek
Koyukuk district
ML 94 00585 1

Niesen, Randy/Smith, Blair
P.O. Box 520155
Big Lake, AK 99652
Gold
Falls Creek
Yentna-Cache Creek district
ML 94 00220 1

Northern Lights Mining Inc. (NR)
544 North 600 West
Cedar City, UT 84720
Gold
Jay, Rye, and Flat Creeks
Koyukuk district
ML 94 00320 1

Northstar Exploration & Development (SCR)
2728 E. Thomas Rd., # 100
Phoenix, AZ 85016
Gold
Gulf of Alaska
Cordova district
ML 94 00530 1

Novak, Ross (EIR)
P.O. Box 83200
Fairbanks, AK 99708
Gold
Eureka Creek
Hot Springs district
ML 94 00365 1

Nuna Contractors Inc. (SWR)
5520 Lake Otis Pkwy., #104
Anchorage, AK 99507
Sand & gravel
Dillingham
Bristol Bay
ML 94 00634 1

O'Daniel, J.B. (SCR)
P.O. Box 279
Springer, OK 73458
Gold
Valdez Creek
Valdez Creek district
ML 94 00586 1

O'Daniel, J.B. (NR)
176 Sunny Hills Dr.
Fairbanks, AK 99712
Gold
Prospect Creek
Koyukuk district
ML 94 00587 1

O'Donnell, Franklin L. Jr. (EIR)
P.O. Box 32
Chicken, AK 99732
Gold
Moose Creek
Fortymile district
ML 94 00269 1

Ol Yeller Mine (EIR)
Ralph Simonson
72382 Palmer Jct. Rd.
Elgin, OR 97827
Gold
Totatlanika River
Bonnifield district
ML 94 00224 1

Oliver, Jim (SCR)
2208 Eureka #9
Anchorage, AK 99503
Gold
Big Creek
Yentna-Cache Creek district
ML 94 00232 1

Olsen, Steven (EIR)
P.O. Box 58443
Fairbanks, AK 99711
Gold
Eagle Creek
Circle district
ML 94 00148 1

Olson, Alan (WR)
P.O. Box 165
Palmer, AK 99645
Gold
Near Candle Creek
Candle district
ML 94 00273 1

Omega Mining Company (EIR)
P.O. Box 2748
Fairbanks, AK 99707
Gold
Omega Creek
Hot Springs district
ML 94 00384 1

Outsider Mining Co. (SCR)
John J. Trautner
P.O. Box 909
Girdwood, AK 99587
Gold
Canyon Creek
Seward district
ML 94 00332 1

Owen, Ted (EIR)
P.O. Box BYA
c/o Robert Wolff
Tok, AK 99780
Gold
Walker Fork
Fortymile district
ML 94 00257 1

P&E Mining Inc. (EIR)
#2 Hubb Rd.
P.O. Box 108
Manley Hot Springs, AK 99756
Gold
Warwick Gulch
Livengood-Tolovana district
ML 94 00541 1

P&E Mining Inc. (EIR)
P.O. Box 108
Manley Hot Springs, AK 99756
Gold
Gertrude Creek
Livengood-Tolovana district
ML 94 00588 1

Pacific Mining Inc. (EIR)
P.O. Box 110842
Anchorage, AK 99511
Gold
Porcupine Creek
Circle district
ML 94 00335 1

Parry, James (EIR)
P.O. Box 71656
Fairbanks, AK 99707
Gold
No Grub Creek
Fairbanks district
ML 94 00152 1

Parsons, Anthony C. (WR)
P.O. Box 1496
Nome, AK 99762
Gold
Iron Creek
Kougarok district
ML 94 00228 1

Patrick, Mike (EIR)
P.O. Box 67
Eagle, AK 99738
Gold
Fortymile River
Fortymile district
ML 94 00589 1

Paul & Company (EIR)
P.O. Box 83102
Fairbanks, AK 99708
Gold
Porcupine Creek
Circle district
ML 94 00041 1

Paul & Company (EIR)
P.O. Box 83102
Fairbanks, AK 99708
Gold
Crooked Creek
Circle district
ML 94 00627 1

Paul & Company (EIR)
P.O. Box 83102
Fairbanks, AK 99708
Gold
Frying Pan Creek
Circle district
ML 94 00590 1

Peterson, Donald E. (EIR)
P.O. Box 172
Haines, AK 99827
Gold
Porcupine Creek
Juneau district
ML 94 00591 1

Philpott, Roy (NR)
P.O.Box 72198
Fairbanks, AK 99707
Gold
Smith Creek
Koyukuk district
ML 94 00110 1

Pike, Gary R. (NR)
300 Simpson Way Box 7-13
Fox, AK 99712
Gold
Prospect Creek
Koyukuk-Nolan district
ML 94 00337 1

Plano, Dan and/or Cindy (SWR)
P.O. Box 878275
Wasilla, AK 99687
Gold
Anvil Creek/Innoko River
Innoko district
ML 94 00298 1

Polar Mining Inc. (EIR)
Dan May
4545 Woodriver Dr.
Fairbanks, AK 99709
Gold
Goldstream Creek
Fairbanks district
ML 94 00097 1

Polar Mining Inc. (EIR)
4545 Woodriver Dr.
Fairbanks, AK 99709
Gold
Fish Creek
Fairbanks district
ML 94 00592 1

Pomrenke, Steve G. (WR)
P.O. Box 308
Nome, AK 99762
Gold
Triple Creek
Nome district
ML 94 00297 1

Pretty Creek Mining Inc. (SCR)
P.O. Box 256
Portage, ME 04768
Gold
N/A
Redoubt district
ML 94 00542 1

Prince Creek Mining Co. (SWR)
P.O. Box 279
Palmer, AK 99645
Gold
Prince Creek
Iditarod district
ML 94 00329 1

Quartz Creek Exploration Co. (SCR)
Milo Flothe
P.O. Box 242
Sterling, AK 99672
Gold
Quartz Creek
Hope district
ML 94 00185 1

R&D Environmental Mining (EIR)
7418 Fireoak Dr.
Austin, TX 78759
Gold
Hope Creek
Circle district
ML 94 00198 1

R.A. Hanson Co. Inc. (SWR)
P.O. Box 7400
Spokane, WA 99207
Gold
Salmon River & Tribs
Goodnews district
ML 94 00124 1

R.A. Hanson Co. Inc. (SWR)
P.O. Box 7400
Spokane, WA 99207
Gold
Salmon River & Tribs
Goodnews district
ML 94 00123 1

Rainbow Mining & Development Inc. (SCR)
P.O. Box 697
Palmer, AK 99645
Gold
Peters Creek
Yentna-Cache Creek district
ML 94 00396 1

Red Samm Construction Inc. (SER)
P.O. Box 3097
Bellevue, WA 98009
Sand & gravel
Lena Point
Juneau district
ML 94 00188 1

Redmond, Richard (WR)
P.O. Box 8700
Indian, AK 99540
Gold
Macklin Creek
Kougarok district
ML 94 00387 1

Regner, Leo A. (EIR)
P.O. Box 72733
Fairbanks, AK 99707
Gold
Lillywig Creek
Fortymile district
ML 94 00090 1

Regner, Leo A. (EIR)
P.O. Box 72733
Fairbanks, AK 99707
Gold
Ingle Creek
Fortymile district
ML 94 00606 1

Rhodes, James R. (SCR)
P.O. Box 2838
Kenai, AK 99611
Gold
Mills Creek
Seward district
ML 94 00508 1

Roberts, Roger L. (SWR)
P.O. Box 7
Ophir-Takotna, AK 99675
Gold
Ophir Creek
Innoko-Tolstoi district
ML 94 00105 1

Rubel, John (EIR)
8183 Richardson Hwy
Salcha, AK 99714
Gold
Banner Creek
Fairbanks district
ML 94 00225 1

Salter, Ed (EIR)
P.O. Box 30
Manley, AK 99756
Gold
Pioneer Creek
Hot Springs district
ML 94 00629 1

Sayer, Paul (SWR)
P.O. Box 20
Homer, AK 99603
Gold
Little Creek
Innoko district
ML 94 00167 1

Schene, Earl L. (EIR)
P.O. Box 66
Chicken, AK 99732
Gold
South Fork Fortymile River
Fortymile district
ML 94 00149 1

Schnabel, John J. (SER)
P.O. Box 149
Haines, AK 99827
Gold
Porcupine
Juneau district
ML 94 00034 1

Scofield, Walter P. (EIR)
P.O. Box 1178
Sandy, OR 97055
Gold
South Fork Fortymile River
Fortymile district
ML 94 00517 1

Secon Inc. (SER)
P.O. Box 3097
Bellevue, WA 98009
Sand & gravel
Lena Point
Juneau district
ML 94 00593 1

Seuffert, George Jr. (EIR)
P.O. Box 156
Central, AK 99730
Gold
Deadwood Creek
Circle district
ML 94 00126 1

Shepard, M. Dennis (EIR)
P.O. Box 82504
Fairbanks, AK 99708
Gold
Chatanika River
Fairbanks district
ML 94 00368 1

Shilling, John A. (EIR)
P.O. Box 81424
Fairbanks, AK 99708
Gold
Thanksgiving Creek
Hot Springs District
ML 94 00099 1

Shorti-Jack Mining (EIR)
P.O. Box 71587
Fairbanks, AK 99707
Gold
Bonanza Creek
Circle district
ML 94 00594

Silverado Mines (U.S.) Inc. (NR)
2580-1066 W. Hasting St.
Vancouver, BC V6E 3X2
Gold
Nolan Creek
Koyukuk-Nolan district
ML 94 00153 1

Silverado Mines (U.S.) Inc. (EIR)
2580-1066 West Hastings
Vancouver, BC V6E 3X2
Gold
Ester Dome Uplands
Fairbanks district
ML 94 00537 1

Simpson, Fishell & Biddle (EIR)
2130 Nottingham Dr.
Fairbanks, AK 99709
Gold
Eureka Creek
Hot Springs district
ML 94 000319 1

Sipes, John (EIR)
2741 Perimeter Dr.
North Pole, AK 99705
Gold
Deadwood Creek
Circle district
ML 94 00045 1

Skidmore, Samuel C. (EIR)
P.O. Box 70470
Fairbanks, AK 99707
Gold
Vault Creek
Fairbanks district
ML 94 00223 1

Smith, Carl R. and Beth A. (EIR)
P.O. Box 764
Tok, AK 99780
Gold
Eagle Creek
Fortymile district
ML 94 00516 1

Smith, Patrick D. (SCR)
P.O. Box 865
Kenai, AK 99611
Gold
N/A
Seward district
ML 94 00595 1

Smith, William L. (SCR)
906 Cunningham
Anchorage, AK 99501
Gold
Silvertip Creek
Seward district
ML 94 00182 1

Snyder, Donald L. (EIR)
P.O. Box 54
Chicken, AK 99732
Gold
South Fork Fortymile River
Fortymile district
ML 94 00378 1

Sobanja, Hans (NR)
P.O. Box 10196
Fairbanks, AK 99710
Gold
Gold Creek
Koyukuk-Nolan district
ML 94 00326 1

Soule, Harold L. (SCR)
2840 E. 142nd Ave.
Anchorage, AK 99516
Gold
Windy Creek
Yentna-Cache Creek district
ML 94 00104 1

Sound Quarry Inc. (WR)
P.O. Box 2011
Nome, AK 99762
Sand & gravel
Cape Nome
Cape Nome district
ML 94 00180 1

Sphinx Natural Resources (EIR)
Malvy Technology Inc.
9600 Long Point, Ste. 101
Houston, TX 77055
Gold
Trail Creek
Ruby district
ML 94 00596 1

States, Mike & Bendall, Larry (NR)
P.O. Box 81485
Fairbanks, AK 99708
Gold
Fay Creek
Koyukuk district
ML 94 00597 1

Stebbins Native Corporation (WR)
P.O. Box 710110
Stebbins, AK 99671
Sand & gravel
Port Clarence district
ML 94 00210 1

Steward, Jackie J. (EIR)
P.O. Box 2607
Fairbanks, AK 99709
Gold
North Fork Goodpaster River
Fairbanks district
ML 94 00607 1

Swan, James W. (NR)
452 Winter Ave.
Fairbanks, AK 99712
Gold
Gold Creek
Koyukuk-Nolan district
ML 94 00069 1

Swenson, Lloyd D. (NR)
1843 Bridgewater Dr.
Fairbanks, AK 99709
Gold
Slate Creek
Koyukuk-Nolan district
ML 94 00598 1

Swenson, Mark D. (NR)
3424 Moosewalk Rd.
North Pole, AK 99705
Gold
Gold Creek
Koyukuk-Nolan district
ML 94 00599 1

Swenson, Richard A. (EIR)
P.O. Box 16205
Two Rivers, AK 99716
Gold
Doric Creek
Hot Springs district
ML 94 00369 1

Tachick, Wayne (EIR)
P.O. Box 3503
Soldotna, AK 99669
Gold
Rex Creek
Bonnifield district
ML 94 00535 1

Tachik, Wayne H. (EIR)
P.O. Box 3503
Soldotna, AK 99669
Gold
Eva Creek
Bonnifield district
ML 94 00618 1

Taiga Mining Company Inc. (WR)
4740 E 115th Ave.
Anchorage, AK 99516
Gold
Bear Creek
Koyukuk-Hughes district
ML 94 00119 1

Taiga Mining Company Inc. (WR)
4740 E 115th Ave.
Anchorage, AK 99516
Gold
Aloha Creek
Koyukuk-Hughes district
ML 94 00135 1

Taiga Mining Company Inc. (WR)
4740 E 115th Ave.
Anchorage, AK 99516
Gold
Bear Creek
Koyukuk-Hughes district
ML 94 00600 1

Taiga Mining Company Inc. (WR)
4740 E 115th Ave.
Anchorage, AK 99516
Gold
Clear Creek
Koyukuk-Hughes district
ML 94 00136 1

Taylor, Larry R. (EIR)
P.O. Box 101
Eagle River, AK 99738
Gold
Fortymile River
Fortymile district
ML 94 00632 1

Thomas, Martha (NR)
P.O. Box 10996
Fairbanks, AK 99710
Gold
Prospect
Koyukuk-Nolan district
ML 94 00340 1

Thomas, Scott (EIR)
P.O. Box 71645
Fairbanks, AK 99707
Gold
Deadwood Creek
Circle district
ML 94 00382 1

Three G Mining (SCR)
Jack LaCross
P.O. Box 648
Talkeetna, AK 99676
Gold
Mills Creek
Yentna-Cache Creek district
ML 94 00196 1

Thurman Oil & Mining (EIR)
925 Aurora Dr.
Fairbanks, AK 99709
Gold
Thanksgiving Creek
Hot Springs district
ML 94 00616 1

Thurman Oil & Mining (EIR)
925 Aurora Dr.
Fairbanks, AK 99709
Gold
Woodchopper Creek
Hot Springs district
ML 94 00617 1

Thurman Oil & Mining Inc. (EIR)
925 Aurora Dr.
Fairbanks, AK 99709
Gold
Upper Glenn Creek
Hot Springs district
ML 94 00086 1

Thurman Oil & Mining Inc. (EIR)
925 Aurora Dr.
Fairbanks, AK 99709
Gold
Rhode Island Creek
Manley Hot Springs district
ML 94 00527 1

Thurneau, Neil (EIR)
P.O. Box 50
Chicken, AK 99732
Gold
Walker Fork Younger Creek
Fortymile district
ML 94 00355 1

Toohey, Camden & Cynthia (SCR)
P.O. Box 113
Girdwood, AK 99587
Gold
Crow Creek
Seward district
ML 94 00230 1

Trans Alas-can Gold (SCR)
3605 Arctic Blvd., #1382
Anchorage, AK 99503
Gold
White Creek
Valdez Creek district
ML 94 00020 1

Trinity Mining (WR)
P.O. Box 372
Kotzebue, AK 99752
Gold
Humboldt Creek
Fairhaven-Inmachuk district
ML 94 00013 1

Trinity Mining (WR)
P.O. Box 372
Kotzebue, AK 99752
Gold
Washington Creek
Fairhaven-Inmachuk district
ML 94 00142 1

Triple D Mining (EIR)
Daniel D. Draper
P.O. Box 213
Gakona, AK 99586
Gold
Cherry Creek
Fortymile district
ML 94 00524 1

Tuluksak Dredging (SWR)
NYAC Mining
415 W 8th Ave.
Anchorage, AK 99501
Gold
Tuluksak River
Aniak district
ML 94 00168 1

University of Alaska (EIR)
910 Yukon Dr., Ste. 211
Fairbanks, AK 99775
Gold
1st Chance Creek
Fairbanks district
ML 94 00383 1

Usibelli Coal Mine Inc. (EIR)
P.O. Box 1000
Healy, AK 99743
Coal
Poker Flats Mine
Bonnifield district
ML 94 00533 1

Usibelli Coal Mine Inc. (EIR)
P.O. Box 1000
Healy, AK 99743
Coal
Gold Run Pass
Bonnifield district
ML 94 00532 1

Vander Wal, John K. (EIR)
HC 1 Box 3100
Healy, AK 99743
Gold
Walker Creek
Bonnifield district
ML 94 00609 1

Vander Wal, Jon K. (EIR)
HC1 Box 3100
Healy, AK 99743
Gold
Thistle Creek
Bonnifield district
ML 94 00630 1

Vetter, Rudolph (EIR)
P.O. Box 70342
Fairbanks, AK 99707
Gold
Portage and Half Dollar Creeks
Circle district
ML 94 00601 1

Victoria Creek Mine (EIR)
Vincent C. Monzulla
2920 Monzulla Lane
Fairbanks, AK 99712
Gold
Victoria Creek
Fairbanks district
ML 94 00625 1

Vogt, Ray A. (EIR)
2108 Central Ave.
Fairbanks, AK 99701
Gold
Dome Creek
Livengood-Tolovana district
ML 94 00053 1

Voytilla, Earl W. (EIR)
P.O. Box 58211
Fairbanks, AK 99711
Gold
Tenderfoot Creek
Richardson district
ML 94 00236 1

Wade Reese Mining (SCR)
Wade Reese
P.O. Box 141086
Anchorage, AK 99514
Gold
Squaw Creek
Willow Creek district
ML 94 00602 1

Wales Native Corporation (WR)
P.O. Box 529
Wales, AK 99783
Sand & gravel
East Village Creek
Cape Nome district
ML 94 00248 1

Wales Native Corporation (WR)
P.O. Box 529
Wales, AK 99783
Sand & gravel
NE Village Creek
Cape Nome district
ML 94 00247 2

Walsh, Daniel P. (WR)
4600 Mars Dr.
Anchorage, AK 99507
Gold
Dexter Creek
Nome district
ML 94 00259 1

Walton Mining (EIR)
1247 Hartzog Loop
North Pole, AK 99705
Gold
Dome Creek
Fairbanks district
ML 94 00552 1

Warhus, Thomas P. (SCR)
P.O. Box 763
Cooper Landing, AK 99572
Gold
Dry Creek
Seward district
ML 94 00556 1

Watkins, Jim (SCR)
P.O. Box 697
Palmer, AK 99645
Gold
N/A
Yentna-Cache Creek district
ML 94 00626 1

Weathers, Douglas & Edith (SCR)
P.O. Box 8082
Nikiski, AK 99635
Gold
Cache Creek
Yentna-Cache Creek district
ML 94 00206 1

Wells, Lu L. (EIR)
P.O. Box 74393
Fairbanks, AK 99709
Gold
Kokomo Creek
Fairbanks district
ML 94 00286 1

White, Paul/Peede, Patrick (EIR)
2551 Peede Rd.
North Pole, AK 99705
Gold
Newman Creek
Fairbanks district
ML 94 00068 1

Wiggers, Dan A. Sr. (NR)
HC 30 Box 5382
Wasilla, AK 99654
Gold
Hammond River
Koyukuk-Nolan district
ML 94 00256 1

Wilder, Richards (EIR)
117 Elray St.
Fairbanks, AK 99709
Gold
Little Boulder Creek
Hot Springs district
ML 94 00603 1

Williams, Wilbur A. & Ann J. (SWR)
1908 W. Hillcrest Dr., #5
Anchorage, AK 99517
Gold
Granite Creek
Iditarod district
ML 94 00166 1

Willis, Dean L. (EIR)
P.O. Box 30063
Central, AK 99730
Gold
Crooked Creek
Circle district
ML 94 00085 1

Wolff, Gordon (SCR)
618 W. 86th Ct.
Anchorage, AK 99515
Gold
Peters Creek
Yentna-Cache Creek district
ML 94 00234 1

Wright, Richard L. (NR)
3910 Tilleson Way
North Pole, AK 99705
Gold
Magnet Creek
Koyukuk-Nolan district
ML 94 00394 1

Wright, Robert P. (EIR)
P.O. Box 60783
Fairbanks, AK 99706
Gold
Last Chance Creek
Fairbanks district
ML 94 00608 1

Yoder, Brian K. Sr. (NR)
3070 Amber Ave
Fairbanks, AK 99709
Gold
Sheep Creek
Chandalar district
ML 94 00373 2

Young, Michael (EIR)
P.O. Box 70277
Fairbanks, AK 99707
Gold
Murphy Creek
Fairbanks district
ML 94 00604 1

Yukon Placer (EIR)
James Munsell
P.O. Box 81155
Fairbanks, AK 99708
Gold
Little Minook Creek
Rampart district
ML 94 00171 1

APPENDIX F
Primary metals production in Alaska, 1880-1994[a]

Year	Gold (oz)	Gold (m$)	Silver (oz)	Silver (t$)	Mercury (flask[b])	Mercury (t$)	Antimony (lb)	Antimony (t$)	Tin (lb)	Tin (t$)	Lead (tons)	Lead (t$)	Zinc (tons)	Zinc (t$)	Platinum (oz)	Platinum (t$)	Copper (lb)	Copper (m$)	Chromium (tons)	Chromium (t$)
1880-1899	1,153,889	23.85	496,101	329.0	--	--	--	--	--	--	250	17.0	--	--	--	--	--	--	--	--
1900	395,030	8.17	73,300	45.5	--	--	--	--	--	--	40	3.4	--	--	--	--	--	--	--	--
1901	335,369	6.93	47,900	28.6	--	--	--	--	--	--	40	3.4	--	--	--	--	250,000	0.04	--	--
1902	400,709	8.28	92,000	48.5	--	--	--	--	30,000	8.0	30	2.5	--	--	--	--	360,000	0.04	--	--
1903	420,069	8.68	143,600	77.8	--	--	--	--	50,000	14.0	30	2.5	--	--	--	--	1,200,000	0.16	--	--
1904	443,115	9.16	198,700	114.9	--	--	--	--	28,000	8.0	30	2.5	--	--	--	--	2,043,586	0.28	--	--
1905	756,101	15.63	132,174	80.2	--	--	--	--	12,000	4.0	30	2.6	--	--	--	--	4,805,236	0.75	--	--
1906	1,066,030	22.04	203,500	136.4	--	--	--	--	68,000	38.6	30	3.4	--	--	--	--	5,871,811	1.13	--	--
1907	936,043	19.35	149,784	98.8	--	--	--	--	44,000	16.8	30	3.2	--	--	--	--	6,308,786	1.26	--	--
1908	933,290	19.29	135,672	71.9	--	--	--	--	50,000	15.2	40	3.4	--	--	--	--	4,585,362	0.61	--	--
1909	987,417	20.41	147,950	76.9	--	--	--	--	22,000	7.6	69	5.9	--	--	--	--	4,124,705	0.54	--	--
1910	780,131	16.13	157,850	85.2	--	--	--	--	20,000	8.3	75	6.6	--	--	--	--	4,241,689	0.54	--	--
1911	815,276	16.85	460,231	243.9	--	--	--	--	122,000	52.8	51	4.5	--	--	--	--	27,267,778	3.40	--	--
1912	829,436	17.14	515,186	316.8	--	--	--	--	260,000	119.6	45	4.1	--	--	--	--	29,230,491	4.82	--	--
1913	755,947	15.63	362,563	218.9	--	--	--	--	100,000[c]	44.1[c]	6	0.6	--	--	--	--	21,659,958	3.35	--	--
1914	762,596	15.76	394,805	218.3	--	--	--	--	208,000	66.6	28	1.3	--	--	--	--	21,450,628	2.85	--	--
1915	807,966	16.70	1,071,782	543.3	--	--	520,000	W	204,000	78.8	437	41.1	--	--	--	--	86,509,312	15.14	--	--
1916	834,068	17.24	1,379,171	907.4	--	--	1,200,000	W	278,000	121.0	820	113.2	--	--	8	0.7	119,654,839	29.50	--	--
1917	709,049	14.66	1,239,150	1,020.6	--	--	500,000	W	200,000	123.3	852	146.6	--	--	53	5.5	88,793,400	24.40	1,100	W
1918	458,641	9.48	847,789	847.8	--	--	540,000	W	136,000	118.0	564	80.1	--	--	284	36.6	69,224,951	17.10	1,100	W
1919	455,984	9.42	629,708	705.3	--	--	--	--	112,000	73.4	687	72.1	--	--	569	73.7	47,220,771	8.80	--	--
1920	404,683	8.37	953,546	1,039.7	--	--	--	--	32,000	16.1	875	140.0	--	--	1,478	160.1	70,435,363	13.00	--	--
1921	390,558	8.07	761,085	761.1	45	1.5	--	--	8,000	2.4	759	68.3	--	--	40	2.7	57,011,597	7.40	--	--
1922	359,057	7.42	729,945	729.9	--	--	--	--	2,800	0.9	377	41.5	--	--	29	2.8	77,967,819	10.50	--	--
1923	289,539	5.98	814,649	668.1	--	--	--	--	3,800	1.6	410	57.4	--	--	--	--	85,920,645	12.60	--	--
1924	304,072	6.29	669,641	448.6	2	0.3	--	--	14,000	7.1	631	100.9	--	--	28	2.6	74,074,207	9.70	--	--
1925	307,679	6.36	698,259	482.4	44	3.6	W	W	28,600	15.4	789	140.6	--	--	10	1.2	73,055,298	10.30	--	--
1926	324,450	6.70	605,190	377.0	22	1.7	W	W	16,000	10.4	778	124.4	--	--	3,570	274.5	67,778,000	9.49	--	--
1927	286,720	5.97	350,430	215.0	--	--	--	--	53,400	34.0	1,008	127.0	--	--	--	--	55,343,000	7.25	--	--
1928	331,140	6.85	351,730	187.0	--	--	--	--	82,000	41.0	1,019	118.0	--	--	120	9.0	41,421,000	5.96	--	--
1929	375,438	7.76	472,900	252.0	4	0.5	--	--	77,200	35.0	1,315	166.0	--	--	475	32.0	40,570,000	7.13	--	--
1930	408,983	8.47	408,570	157.3	--	--	--	--	29,400	9.3	1,365	136.5	--	--	--	--	32,651,000	4.24	--	--
1931	459,000	9.51	352,000	102.0	15	1.2	--	--	8,200	2.0	1,660	126.0	--	--	393	14.0	22,614,000	1.88	--	--
1932	493,860	10.20	234,050	66.0	8	0.5	--	--	--	--	1,260	75.6	--	--	--	--	8,738,500	0.55	--	--
1933	469,286	9.70	154,700	55.0	--	--	--	--	5,800	2.3	1,157	85.6	--	--	605	18.6	29,000	0.02	--	--
1934	537,281	8.78	154,700	100.0	--	--	--	--	8,200[c]	4.3	839	62.1	--	--	2,555	85.6	121,000	0.06	--	--
1935	469,495	16.43	286,600	206.0	--	--	--	--	98,800	49.8	815	65.2	--	--	8,685	259.6	15,056,000	1.25	--	--
1936	540,580	18.92	484,306	375.0	--	--	--	--	226,000	105.0	941	86.6	--	--	5,654	241.9	39,267,000	3.72	--	--
1937	627,940	21.98	494,340	382.0	--	--	962,000	147.6	372,000[c]	202.3[c]	823	97.1	--	--	9,823	313.4	36,007,000	4.74	--	--
1938	662,000	23.17	479,853	310.0	8	0.6	444,000	54.8	210,000	89.1	994	91.5	--	--	41,000	2,460.0	29,760,000	2.98	--	--
1939	676,780	23.68	201,054	136.5	--	--	210,000	25.9	66,000	38.0	937	88.1	--	--	33,900	2,034.0	278,500	0.04	--	--
1940	755,900	26.45	191,679	136.3	156[c]	130.9	306,000	42.8	92,000	52.0	840	72.0	--	--	28,886	1,093.0	110,000	0.02	--	--
1941	692,314	24.23	199,700	142.0	W	W	774,000	87.3	93,600[c]	61.0[c]	742	58.0	--	--	22,630	813.0	144,000	0.02	--	--
1942	487,657	17.07	135,200	96.0	W	W	316,000	41.0	5,600	2.5	523	44.0	--	--	22,000	779.0	48,000	0.01	--	--
1943	99,583	3.49	31,700	22.0	786	153.4	368,000	33.3	2,000[c]	1.0[c]	200	22.0	--	--	27,900	1,020.0	54,000	0.01	5,564	186.3
1944	49,296	1.73	15,240	10.8	841	165.0	70,080	30.0	--	--	44	5.8	--	--	33,616	2,017.0	4,000	0.01	1,845	64.6
1945	68,117	2.38	9,983	6.2	275	180.0	W	W	--	--	11	1.8	--	--	22,949	1,377.0	10,000	0.01	--	--
1946	226,781	7.93	41,793	26.3	699	68.7	W	W	--	--	115	25.0	--	--	22,882	1,418.7	4,000	0.01	--	--
1947	279,988	9.79	66,150	46.3	127	10.6	52,000	16.1	2,000	2.2	255	76.5	226	0.15	13,512	1,351.2	24,000	0.06	--	--
1948	248,395	8.69	67,341	58.7	108	7.8	88,000	29.3	10,000	10.8	317	88.9	226	0.15	13,741	1,209.2	28,000	0.07	--	--
1949	229,416	8.03	36,056	32.4	102	7.9	88,000	31.3	114,000	100.8	49	11.2	226	0.15	17,169	1,545.2	7,700	0.02	--	--

APPENDIX F
continued

Year	Gold (oz)	Gold (m$)	Silver (oz)	Silver (t$)	Mercury (flask[b])	Mercury (t$)	Antimony (lb)	Antimony (t$)	Tin (lb)	Tin (t$)	Lead (tons)	Lead (t$)	Zinc (tons)	Zinc (t$)	Platinum (oz)	Platinum (t$)	Copper (lb)	Copper (m$)	Chromium (tons)	Chromium (t$)
1950	289,285	10.13	52,638	48.0	W	W	W	W	158,000	170.3	144	27.5	--	--	W	W	12,000	0.03	--	--
1951	239,628	8.38	32,870	29.8	28	W	1,718,000	2,061.6	138,000	198.0	21	7.2	--	--	W	W	2,000	0.01	--	--
1952	240,571	8.42	31,825	28.7	40	W	740,000	1,406.0	180,000	243.9	1	0.3	--	--	W	W	--	--	W	W
1953	253,771	8.88	35,387	32.1	1,023	270.0	W	W	98,000	105.9	--	--	--	--	17,489	1,696.4	--	--	W	W
1954	248,511	8.70	33,694	31.8	1,046	276.0	--	--	398,000	409.9	--	--	--	--	18,790	1,615.9	8,000	0.02	2,953	208.0
1955	249,294	8.73	33,693	30.4	43	12.0	--	--	172,000	182.5	1	0.3	--	--	17,253	1,466.5	2,000	0.01	7,082	625.3
1956	204,300	7.33	26,700	24.1	3,414	837.0	134,400	150.0	--	--	1	0.3	--	--	17,934	1,829.3	--	--	7,200	711.5
1957	215,467	7.54	28,862	26.0	5,461	1,349.0	71,120	80.0	--	--	9	3.0	--	--	15,479	1,377.6	--	--	4,207	431.0
1958	186,000	6.53	24,000	22.0	3,380	774.0	--	--	--	--	--	--	--	--	10,284	647.9	10,000	0.03	--	--
1959	171,000	5.99	22,000	20.0	3,750	852.0	--	--	--	--	--	--	--	--	10,698	770.3	72,000	0.04	--	--
1960	180,000	6.30	23,000	21.0	4,450	938.0	W	W	--	--	--	--	--	--	13,352	1,054.8	82,000	0.04	--	--
1961	114,228	3.99	--	--	4,080	816.0	--	--	--	--	--	--	--	--	16,133	1,274.5	184,000	0.06	--	--
1962	165,142	5.78	--	--	3,843	711.0	--	--	--	--	--	--	--	--	12,520	951.5	--	--	--	--
1963	99,000	3.48	6,100	9.0	400	76.0	W	W	--	--	5	1.1	--	--	12,322	961.1	--	--	--	--
1964	58,000	2.05	7,200	6.0	303	95.0	46,400	60.3	--	--	--	--	--	--	13,010	1,522.2	22,000	0.01	--	--
1965	43,000	1.51	5,000	6.0	180	104.0	46,400	60.3	--	--	14	4.0	--	--	10,365	1,368.2	64,000	0.03	--	--
1966	27,325	0.96	7,000	9.0	185	101.0	16,000	19.2	--	--	19	4.3	--	--	9,033	1,273.7	--	--	--	--
1967	22,948	0.80	6,000	9.0	161	79.0	20,000	22.0	--	--	--	--	--	--	7,888	1,238.4	W	W	--	--
1968	21,000	0.81	3,000	6.5	156	78.0	6,000	6.0	--	--	--	--	--	--	8,433	1,652.9	--	--	--	--
1969	21,227	0.88	2,000	4.2	238	100.0	94,000	100.0	--	--	2	0.5	--	--	8,500	2,321.2	--	--	--	--
1970	38,400	1.38	4,000	7.0	3,100	1,260.0	365,000	410.0	--	--	--	--	--	--	6,015	925.1	W	W	--	--
1971	34,000	1.36	2,000	4.0	675	285.0	68,000	74.0	34,000	47.0	--	--	--	--	5,407	625.6	--	--	--	--
1972	8,639	0.56	1,000	2.0	125	44.0	160,000	185.0	W	W	--	--	--	--	6,478	985.5	--	--	--	--
1973	15,000	1.86	13,200	22.0	70	52.5	420,000	515.0	10,000	12.0	6	2.0	--	--	5,524	964.5	--	--	--	--
1974	16,000	2.56	1,500	3.5	70	52.5	80,000	95.0	W	W	--	--	--	--	4,351	1,067.0	--	--	--	--
1975	14,980	3.35	6,000	25.0	--	--	120,000	145.0	22,000	60.0	--	--	--	--	3,726	623.3	--	--	--	--
1976	22,887	6.90	6,500	24.0	--	--	160,000	165.0	W	W	14	6.0	--	--	3,212	515.2	--	--	8,000[c]	1,200.0[c]
1977	50,000	7.80	8,000	20.0	--	--	W	W	W	W	--	--	--	--	6,891	1,119.8	--	--	--	--
1978	60,000	12.00	6,000	50.0	--	--	W	W	W	W	--	--	--	--	--	--	--	--	--	--
1979	65,000	18.00	6,500	93.0	--	--	100,000	125.0	100,000	830.0	--	--	--	--	--	--	--	--	--	--
1980	75,000	32.00	7,500	111.0	--	--	--	--	120,000	984.0	31	29.0	--	--	--	--	--	--	--	--
1981	134,200	55.20	13,420	111.3	W	W	--	--	106,000	700.0	--	--	--	--	900	200.0	--	--	--	--
1982	175,000	69.90	22,000	198.0	--	--	--	--	198,000	1,365.0	--	--	--	--	W	W	--	--	--	--
1983	169,000	67.60	33,200	332.0	--	--	22,400	45.0	215,000	1,100.0	--	--	--	--	W	W	--	--	--	--
1984	175,000	62.13	20,000	159.0	5	1.5	135,000	225.8	225,000	400.0	--	--	--	--	W	W	--	--	--	--
1985	190,000	61.18	28,500	171.0	27	10.0	65,000	98.0	300,000	650.0	--	--	--	--	--	--	--	--	--	--
1986	160,000	60.80	24,000	134.4	12	2.8	45,000	67.5	340,000	890.0	--	--	--	--	W	W	--	--	--	--
1987	229,707	104.51	54,300	391.0	--	--	--	--	288,000	460.0	--	--	--	--	W	W	--	--	--	--
1988	265,500	112.84	47,790	282.0	W	W	--	--	300,000	950.0	--	--	--	--	25	13.8	--	--	--	--
1989	284,617	108.7	5,211,591	27,300.0	--	--	--	NR	194,000	672.0	9,585	7,700.0	19,843	29,400.0	--	--	--	--	--	--
1990	231,700	89.20	10,135,000	50,675.0	--	--	--	--	57,000	200.0	44,220	30,954.0	181,200	253,680.0	--	--	--	--	--	--
1991	243,900	88.29	9,076,854	39,110.0					6,800	22.1	69,591	33,403.7	278,221	278,221.0	15	5.3	--	--	--	--
1992	262,530	88.46	9,115,755	34,913.0	--	--	--	--	1,500	5.9	68,664	31,585.0	274,507	301,957.7	--	--	--	--	--	--
1993	191,265	68.64	5,658,958	24,333.0	--	--	--	--	21,000	50.6	38,221	13,759.6	268,769	236,516.7	3	1.2	--	--	--	--
1994	182,100	70.29	1,968,000	10,391	--	--	--	--	--	--	36,447	25,512.9	329,003	296,102.7	5	2.1	--	--	--	--
Other[c]	--	--	--	--	1,438	--	--	--	--	--	--	--	--	--	71,946	17,091.9	--	--	--	--
TOTAL (metric)	**33,236,266 (1,034 tonnes)**	**1,943.90**	**61,183,843 (1,903 tonnes)**	**203,069.4**	**40,945 (1,411,521 kg)**	**9,910.5**	**11,070,800 (5,021 tonnes)**	**6,655.1**	**7,287,700 (3,305 tonnes)**	**12,523.5**	**293,028 (265,835 tonnes)**	**145,924.3**	**1,352,221 (1,226,734 tonnes)**	**1,395,878.6**	**668,545[d] (20,793 kg)**	**65,814.5**	**1,373,793,932 (632,152 tonnes)**	**228.04**	**39,951 (35,419 tonnes)**	**3,426.7**

[a]From published and unpublished state and federal documents.
[b]76-lb flask.
[c]Not traceable by year.
[d]Crude platinum; total production of refined metal is about 575,000 oz.

W = Withheld.
-- = Not reported.
t$ = Thousand dollars.
m$ = Million dollars.

APPENDIX G

Production of industrial minerals, coal, and other commodities in Alaska, 1880-1994

Year	Coal		Sand and gravel		Building stone[a]		Barite		Other[b]
	s. tons	m$	s. tons	m$	s. tons	m$	s. tons	t$	$
1880-1899[c]	19,429	0.14	--	--	7,510	0.04	--	--	--
1900	1,200[d]	0.02[d]	--	--	510	0.01	--	--	--
1901	1,300[d]	0.02[d]	--	--	700	0.01	--	--	500
1902	2,212[d]	0.02[d]	--	--	800	0.01	--	--	255
1903	1,447	0.01	--	--	920	0.01	--	--	389
1904	1,694	0.01	--	--	1,080	0.02	--	--	2,710
1905	3,774	0.02	--	--	970	0.02	--	--	740
1906	5,541	0.02	--	--	2,863	0.03	--	--	19,965
1907	10,139	0.05		--	3,899	0.03	--	--	54,512
1908	3,107[d]	0.01[d]	--	--	2,176	0.03	--	--	81,305
1909	2,800	0.02	--	--	1,400	0.01	--	--	86,027
1910	1,000[d]	0.01[d]	--	--	W	W	--	--	96,408
1911	900[d]	0.01[d]	--	--	W	W	--	--	145,739
1912	355[d]	0.01[d]	--	--	W	W	--	--	165,342
1913	2,300	0.01	--	--	W	W	--	--	286,277
1914	1,190	0.01	--	--	W	W	--	--	199,767
1915	1,400	0.03	--	--	W	W	--	--	205,061
1916	12,676	0.05	--	--	W	W	--	--	326,731
1917	54,275	0.27	--	--	W	W	--	--	203,971
1918	75,816	0.41	--	--	W	W	--	--	171,452
1919	60,894	0.35	--	--	50,014	0.29	--	--	214,040
1920	61,111	0.36	--	--	37,044	0.27	--	--	372,599
1921	76,817	0.49	--	--	59,229	0.31	--	--	235,438
1922	79,275	0.43	--	--	54,251	0.30	--	--	266,296
1923	119,826	0.76	--	--	83,586	0.41	--	--	229,486
1924	99,663	0.56	--	--	35,294	0.26	--	--	348,728
1925	82,868	0.40	--	--	32,193	0.19	--	--	454,207
1926	87,300	0.46	--	--	33,283	0.20	--	--	423,000
1927	104,300	0.55	--	--	41,424	0.22	--	--	--
1928	126,100	0.66	--	--	63,347	0.31	--	--	--
1929	100,600	0.53	--	--	54,766	0.26	--	--	194,000
1930	120,100	0.63	--	--	66,234	0.33	--	--	157,300
1931	105,900	0.56	--	--	59,175	0.29	--	--	108,000
1932	102,700	0.53	--	--	54,167	0.27	--	--	223,400
1933	96,200	0.48	--	--	56,291	0.28	--	--	--
1934	107,500	0.45	--	--	64,234	0.36	--	--	46,155
1935	119,425	0.50	--	--	74,049	0.38	--	--	46,755
1936	136,593	0.57	--	--	76,379	0.38	--	--	45,807
1937	131,600	0.55	--	--	50,057	0.25	--	--	147,048
1938	159,230	0.62	--	--	189,090	0.21	--	--	125,302
1939	143,549	0.60	42,332	0.02	--	--	--	--	--
1940	170,174	0.88	515,011	0.10	--	--	--	--	--
1941	241,250	0.97	530,997	0.09	--	--	--	--	1,367,000
1942	246,600	0.99	W	W	--	--	--	--	1,124,000
1943	289,232	1.84	W	W	--	--	--	--	--
1944	352,000	2.37	712,496	0.50	--	--	--	--	2,350,309
1945	297,644	1.87	W	W	--	--	--	--	5,910,704
1946	368,000	2.36	W	W	--	--	--	--	2,005,241
1947	361,220	2.55	W	W	219,000	1.00	--	--	5,927,319
1948	407,906	2.79	W	W	67,341	0.33	--	--	1,257,699
1949	455,000	3.60	W	W	W	W	--	--	7,181,886

[a]Building-stone production figures for 1880-1937 are for the southcentral and interior regions of Alaska only.
[b]Includes 2.4 million lb U_3O_8 (1955-71); 505,000 tons gypsum (1905-26); 286,000 lb WO_3 (intermittently 1916-80); 94,000 lb asbestos (1942-44); 540,000 lb graphite (1917-18; and 1942-50); and undistributed amounts of zinc, jade, peat, clay, soapstone, miscellaneous gemstones, and other commodities (1880-1993).
[c]Production not traceable by year.
[d]When state (territorial) and federal figures differ significantly, state figures are used. Figures for sand and gravel production in 1974 show state estimates (118,740,000 s. tons; 240.94 m$) and federal (42,614,000 s. tons; 88.96 m$). The federal estimate was not added to total production.
[e]Marble quarried on Prince of Wales Island, southeastern Alaska (1900-41).
m$ = Million dollars.
t$ = Thousand dollars.
-- = Not reported.
W = Withheld.

Year	Coal		Sand and gravel		Building stone[a]		Barite		Other[b]
	s. tons	m$	s. tons	m$	s. tons	m$	s. tons	t$	$
1950	421,455	3.03	3,050,020	2.38	W	W	--	--	2,100,000
1951	494,333	3.77	6,818,000	3.54	W	W	--	--	3,600,000
1952	648,000	5.77	6,817,800	3.54	W	W	--	--	9,052,000
1953	861,471	8.45	7,689,014	5.08	47,086	0.17	--	--	1,231,350
1954	666,618	6.44	6,639,638	6.30	283,734	0.47	--	--	1,572,150
1955	639,696	5.76	9,739,214	8.24	265,740	0.29	--	--	1,552,427
1956	697,730	6.37	9,100,000	8.30	50,000	0.02	--	--	1,551,500
1957	842,338	7.30	6,096,000	8.79	528,000	1.95	--	--	2,751,000
1958	759,000	6.93	4,255,000	3.87	615,000	2.07	--	--	695,000
1959	602,000[d]	5.88[d]	5,600,000	5.10	54,000	0.20	--	--	1,338,000
1960	669,000[d]	5.95[d]	5,892,000	5.35	80,000	0.30	--	--	975,000
1961	650,000[d]	5.87[d]	5,241,000	4.19	--	--	--	--	--
1962	675,000[d]	6.41[d]	5,731,000	5.36	--	--	--	--	--
1963	853,000	5.91	16,926,000	22.01	W	W	W	W	2,589,000
1964	745,000	5.01	26,089,000	18.49	W	W	W	W	4,912,000
1965	860,000[d]	5.88[d]	29,959,000	33.93	W	W	W	W	5,296,000
1966	927,000	6.95	17,457,000	21.79	W	W	44,000	350.0	6,167,000
1967	930,000	7.18	22,300,000	26.25	W	W	W	W	4,924,000
1968	812,000[d]	5.03[d]	17,515,000	20.73	W	W	91,000	W	4,117,000
1969	728,000[d]	4.65[d]	16,205,000	18.62	1,954,000	3.90	90,000	850.0	5,163,000
1970	786,000[d]	5.28[d]	20,375,000[d]	26.07[d]	6,470,000	10.01	134,000[d]	1,875.0	7,994,000
1971	748,000[d]	5.05[d]	26,391,000	41.99	2,658,000	5.07	102,000[d]	1,075.0	--
1972	720,000[d]	6.26[d]	14,187,000	15.21	652,000	3.01	W	W	--
1973	700,000[d]	6.23[d]	19,350,000	19.01	5,967,000	12.00	112,000	1,792.0	12,846,000
1974	700,000	7.34	118,740,000[d]	240.94[d]	5,484,000	12.95	110,000	1,895.0	14,495,000
			42,614,000	88.96					
1975	766,000	7.81	48,145,000	95.78	8,877,000	26.65	2,000[d]	30.0	12,731,000
1976	705,000	8.00	74,208,000[d]	204.73[d]	6,727,000	20.09	W	W	14,019,000
1977	780,000[d]	12.00[d]	66,126,000	134.25	4,008,000	17.47	--	--	14,486,000
1978	750,000	15.00	51,100,000	122.00	3,437,000	14.65	22,000	750.0	--
1979	750,000	16.00	50,900,000	104.90	3,650,000	15.45	20,000	800.0	930,000
1980	800,000	16.00	40,000,000	86.00	3,700,000	15.40	50,000	2,000.0	97,500
1981	800,000	17.60	46,000,000	88.20	4,200,000	19.30	--	--	256,000
1982	830,000	18.00	45,000,000	91.00	3,400,000	15.60	--	--	150,000
1983	830,000	18.00	50,000,000	105.00	5,270,000	25.00	--	--	242,000
1984	849,161	23.75	27,000,000	95.00	2,700,000	16.00	--	--	875,875
1985	1,370,000	39.73	28,184,080	112.06	2,500,000	12.00	--	--	559,000
1986	1,492,707	40.10	20,873,110	75.76	4,200,000	20.32	--	--	384,800
1987	1,508,927	42.35	16,696,374	42.66	1,805,000	11.62	--	--	388,400
1988	1,551,162	44.30	17,264,500	48.75	3,600,000	24.65	--	--	389,000
1989	1,452,353	41.46	14,418,000	39.88	2,914,000	20.34	--	--	1,492,000
1990	1,576,000	44.99	15,013,500	40.82	3,200,000	22.10	--	--	400,000
1991	1,540,000	39.00	14,160,011	45.45	3,000,000	22.50	--	--	462,000
1992	1,531,800	38.30	14,599,746	42.20	2,900,000	22.97	--	--	430,000
1993	1,586,545	38.10	13,162,402	40.64	3,561,324	26.21	--	--	465,000
1994	1,490,000	36.75	13,518,321	40.95	3,843,953	27.04	--	--	459,500
Other[d]	--	--	--	--	2,300,000[e]	W	79,000	W	--
TOTAL (metric)	**46,708,428 (42,373,885 tonnes)**	**738.35**	**1,096,332,564 (994,592,902 tonnes)**	**2,231.8**	**106,445,113 (96,567,007 tonnes)**	**454.10**	**856,000 (776,563 tonnes)**	**11,417.0**	**176,947,372**

U.S. Customary Units/Metric Units Conversion Chart

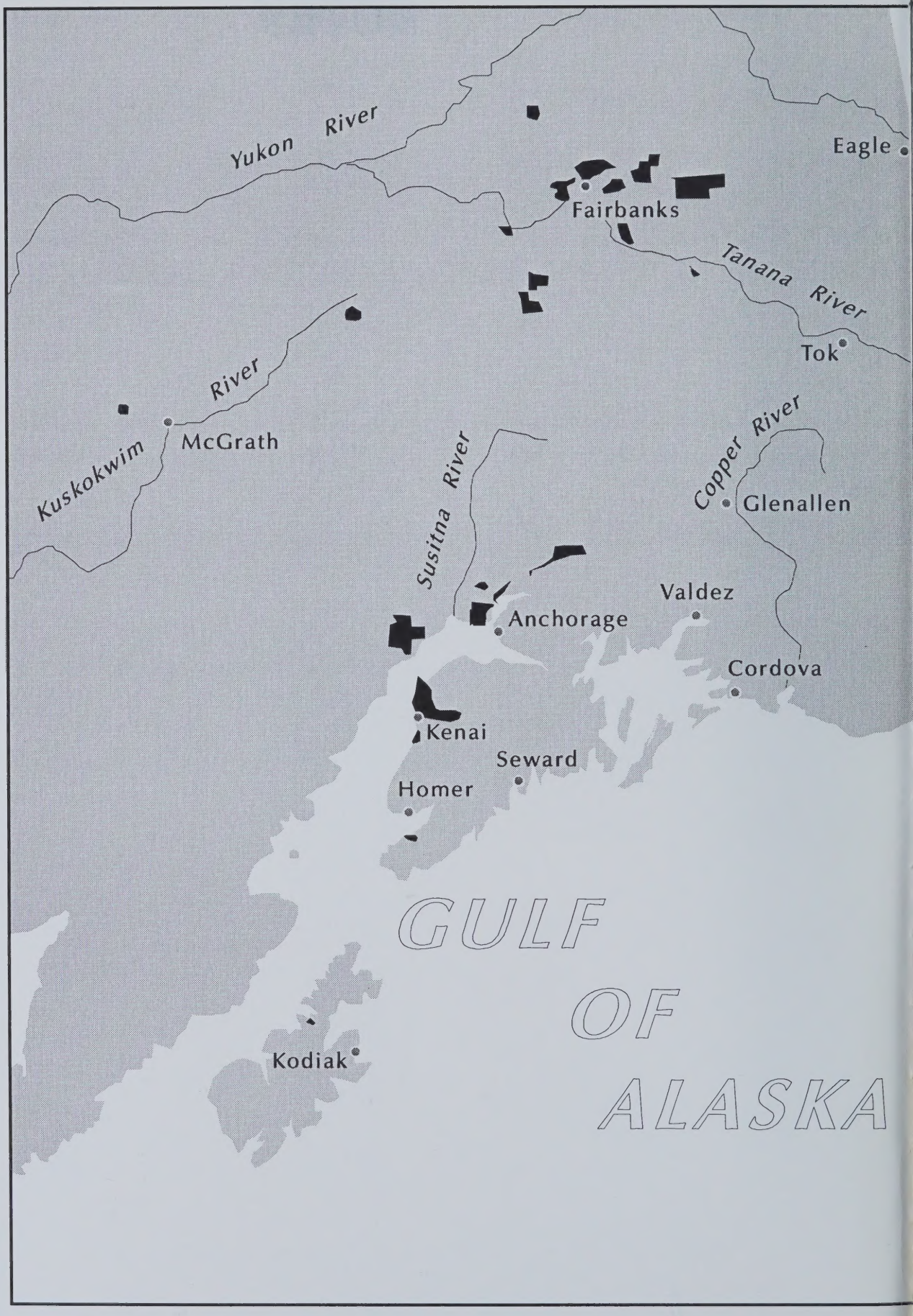
To convert from:	To:	Multiply by:
	Weight/Mass	
ounces (avoirdupois)	grams	28.350
ounces (troy)	grams	31.1035
pounds	kilograms	0.4536
short tons	metric tons	0.9072
grams	ounces (avoirdupois)	0.03527
	ounces (troy)	0.03215
kilograms	pounds	2.2046
metric tons	short tons	1.1023
	Length	
miles	kilometers	1.6093
yards	meters	0.9144
feet	meters	0.3048
	millimeters	3.048
	centimeters	30.48
inches	millimeters	25.4
	centimeters	2.54
kilometers	miles	0.6214
meters	yards	1.0936
	feet	3.2808
millimeters	feet	0.03937
	inches	0.3937
centimeters	inches	3.937
	Area	
square miles	square kilometers	2.590
acres	square meters	4,046.873
	hectares	0.4047
square yards	square meters	0.8361
square feet	square meters	0.0929
square inches	square centimeters	6.4516
	square millimeters	645.16
square kilometers	square miles	0.3861
square meters	acres	0.000247
	square feet	10.764
	square yards	1.196
hectares	acres	2.471
	square meters	10,000.00
square centimeters	square inches	0.155
square millimeters	square inches	0.00155
	Volume	
cubic yards	cubic meters	0.7646
cubic feet	cubic meters	0.02832
cubic inches	cubic centimeter	16.3871
cubic meters	cubic yards	1.3079
	cubic feet	35.3145
cubic centimeters	cubic inches	0.06102
gallons (U.S.)	liters	3.7854
liters	gallons (U.S.)	0.2642
milliliters	ounces (fluid)	0.03381
ounces (fluid)	milliliters	29.5735

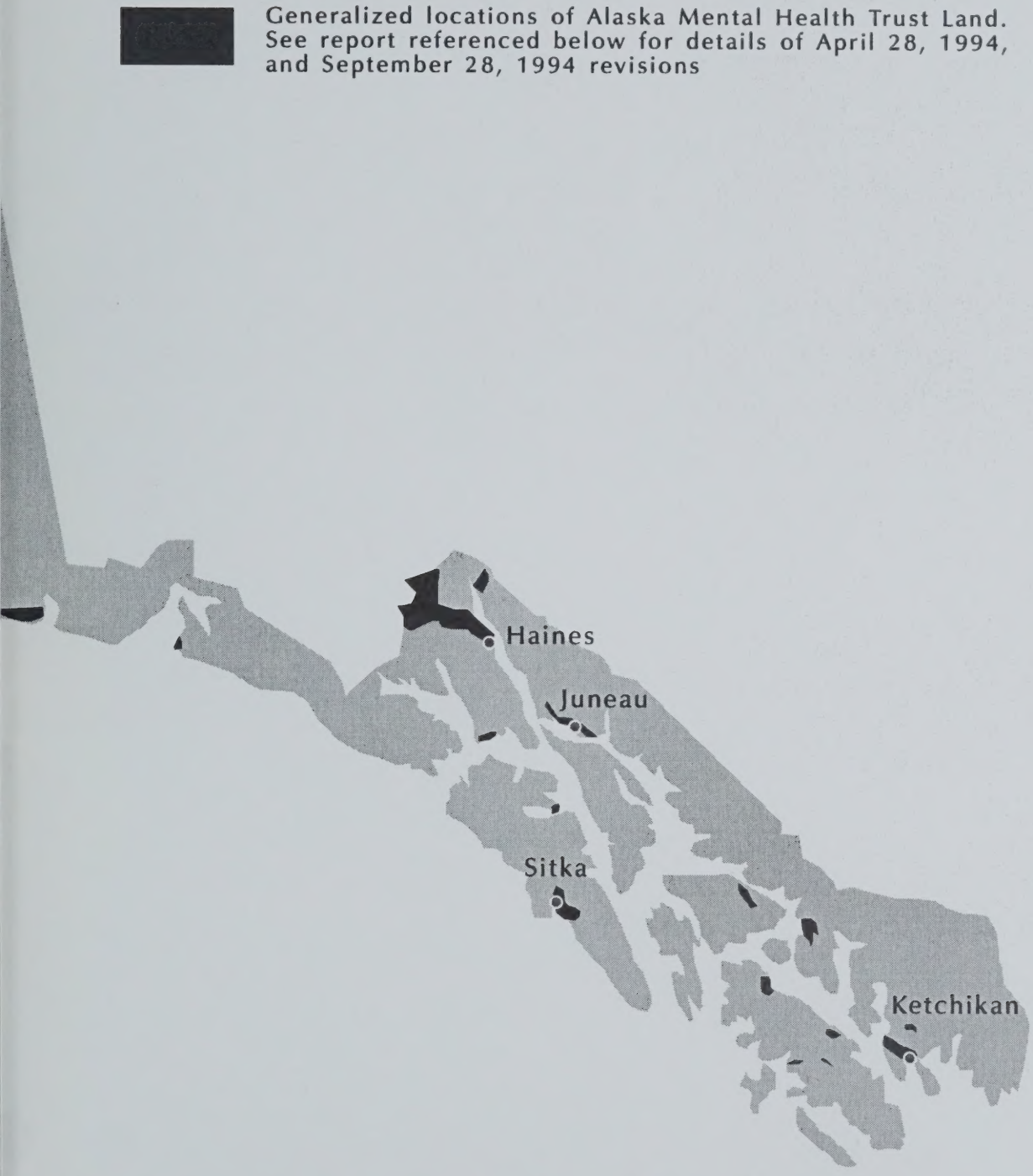
Temperature conversions:
From degrees Fahrenheit to degrees Celsius, subtract 32 and multiply by 5/9.
From degrees Celsius to degrees Fahrenheit, multiply by 9/5 and add 32.

SOURCE: *Minerals Today,* February 1993, U.S. Bureau of Mines.

NOTES

NOTES


Yukon River
Eagle
Fairbanks
Tanana River
Tok
Kuskokwim River
McGrath
Susitna River
Copper River
Glenallen
Valdez
Anchorage
Cordova
Kenai
Seward
Homer
GULF
OF
ALASKA
Kodiak



SOURCE: Alaska Department of Natural Resources, 1994 Reconstitution of the Mental Health Trust and Confirmation and Ratification of Conversion of Certain Original Mental Health Land to General Grant Land: Department of Natural Resource statewide index map, scale 1:4,608,000. Detailed maps (USGS 1:63,360 quadrangles) showing parcel boundaries are available for review at the Department of Natural Resources Public Information Centers in Anchorage, Juneau, and Fairbanks.